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The Well spring of SCIENCES.

which teacheth the perfect worke and practise of Arithmeticke, *both in whole Numbers and Fractions:* set forthe by

HUMFREY BAKER
Londoner, 1562.

And nowe once agayne peruled augmented and amended in all the three partes, by the sayde Aucthour: where vnto he hath also added certein tables of the agreement of measures and waighes of diuers places in Europe, the one with the other as by the table following it may appeare.

1580.

QB2 30

To the right worshipfull,
THE GOVERNOVRE ASsistentes, and the reste of the *Companye of Marchants aduenturers:* Humfrey Baket *Lõdoner wisheth helth with continuall increase of cõmodity by their worthy trauail.*

YF THE KNOWledge of arithmeticke (right Worshipfull) vvere of so small profite in the life of man or so litle vsed in our worldly affiares that it might be well lefte, or but sildome frequented, it were well doone by the professors thereof, to pen very long and eloquent Orations, in setting forth the commendation of the same. But since experience hath taught to bee true the old prouerbe: That where good wyne is to sell, there nede no garland be hanged out: me thinketh they doe greate iniurie vnto Arithmeticke, that seeke to heare the commoditie

modities thereof sette foorthe in a shorte Epistle, and surely they ouercharge me in laying such a burthen on my backe, as were to importable for the greatest Oratour. For the skil hereof is well knowne, immediately to haue flowed from the wisedom of God, into the hart of man, whome he hath created the cheefe Image, & Instrument of his prayse and glorye, reuealing himselfe vnto him so farre as hee iudged conueniente: whome notwithstanding he could not conceaue to remaine in the most secrete misterie of Trinitie in Vnitie, were it not by the benefite of moste diuyne skill in Numbers, whiche skill as also the moste full and effectuall knoweledge of all other thinges vnspeakeable, God vsed in his wonderful creatió of all the worlde out of nothing, whiche he accomplished within the compasse of certaine numher of days expressing moreouer what he made in euery day, and of certain his creatures how many he made, as apereth

in

in the booke of Geniſis, written by ſpeciall reuelation of the holy ghoſt, wherein the diuine maieſtie of God could not be knowen vnto vs vvithout the knowledge of numbers: not Moyſes haue vnderhoode vvhat himſelfe had written. And Salomon the wiſeſt man that euer was, cõſidering the very deapth of all thinges within his minde, to whom God had geuen a greater gift of wiſedome, then to any man eyther before or ſince? doubted not to breake forth in theſe wordes, ſaying: Thou O lorde, haſt diſpoſed all things in meaſure, number and vvaygh̄t, for thus it pleaſed him to iudge: who in another place teſtifieth, howe that he hath ſearched deeper (into they cauſes and knovvledge of all things) then any other man in the worlde. Theſe teſtimonies (right Worshipfull) doo manyfeſtly teache vs what we ought to thinke of the cauſe, and Originall of Arithmeticke, and partly alſo howe neceſſarie it is in the life of man, that

vnleſſe by nature We haue ſome fee-
ling and vnderſtanding therein, wee
are no better thé beaſtes, and in this
reſpect worſe, for that we retane not
that Where vnto we are as ſpecially
borne, as naturally they do, ſome to
running, ſome to ſmelling, ſome to
hearing, ſome to flying, and ſome to
ſwimming Take aWay Arithmetick,
wherin differeth the Shepheard from
the aſſe? Surely but onely in shape
and figure, whiche as the learned af-
firme, is a very ſlender cauſe of diffe-
rence. Wherefore not without juſte
cauſe haue the auncient Fathers and
philoſophers ſingularly extolled the
knowledge of Arithmetike, dili-
gentlye trayning vp there youthe
therein as in a ſience moſt neſſiſarie
of it ſelfe, conſidering the deepe de-
uices, the profounde practices, and
cunning concluſions therein con-
teyned: and allſo that it is the key &
entrance into all other arts and lear-
ning;

ning: as well approued the noble philosopher *Pithagoras* who caused this inscription to be written (vpon his schoole doore where hee taught philosophy) in greate letters, *Neme Arithmetica ignarus hic ingradiatur*: Let none enter heere, that is ignorant in Arithmetike: which saying, as it is proper and peculier vnto all sorte of men in the beginning & entrance into all Liberall knowledge and faculties to be ensued & embraced, so suerly aboue all other, it is (next after the word of God) most fitte and necessary that it should be written vppon youre schoole doores (righe worsipfull) whose trade and trauaile is employed in the noble traffiçque of Marchandise wherin ye haue neede of continuall recourse vnto this excelent art. The dayly exercise whereof hath so sharpened your iudgements, and ripened your vnderstandings, that most of you are become singuler therein, both to

deale that waye your selues, and to iudge of other mens doinges. And heerein I am sure you are good witnesses with mee howe foolishe and vayne is their opinyon which beside your moste commendable affayres, suppose and affyrme that arithmeticke is of small vse vnto any other men, seeing that the lawes of sundry Realmes well instituted and guided haue deseruedly accopted for fooles, and vnfit members, (to rule or deale in a common wealth,) all suche as vvanted the skill of naturall Arithmeticke, depriued them bothe of Landes and liuing, whiche as it tendeth vnto no small prayse and credit of Arithmetick, so am I constrained for breuitie sake, in fewe wordes to ouerpasse both that, & others which mighte be sayde in commendation thereof. Shortly admonishing your worships, that whereas in times paste as is vvell known, I had trauailed in a booke in Englishe of that faculties,

dedicated

dedicated vnto you: being now enforced to runne ouer the same, both amending and augmenting it with sundrye additions: I am so bold againe to attempte your worshippes with the acceptation thereof, hoping that as in fore time ye haue taken it suche as it was, ye will nowe also daigne to receiue it, beeing in better case (I hope) then euer it was a token of my good will, how be it a simple thinge, wherein you maye weighe the harte and not the gifte, proceeding from such a Fountaine, that if better skill and knowledge had bene matched to my good meaninge, it shoulde haue bene done otherwise, to the better contentation of your worthinesse. And therfore in the meane season vntill it please God to furnishe me in suche sorte, I reste in dayly prayer vnto him, to maintaine your felowship in happy estate and to blesse youre purposes with luckye successe, to guide your voy-

ages

ages with wished increase to season your doinges with all kynde of Vertue, & to preserue your liues with desired helth to his will and pleasure.

At London the 2 day of September. 1580.

¶ The

¶ The Prologue to the gentle Rerder.

HAuing sometime now twelue yeres sithence (gentle Reader) published in print one Englishe boke of Arithmetick, conteyning, as I suppose, sundry necessarie and profitable documentes for such as are willing to attayne any knowlege therein. I haue bene often since that time, and of very late also, requested by sundry of my friendes to peruse the the same worke, and as I should nowe iudge it expedient, to adde sumthing more thereunto, and to amplifye the same. Which earnest and frindly suite of theirs, for certayne iuste causes seeming needefull unto me, surely I coulde in nowise denie. For when I perceyued the importunitie of certayne straungers not borne within this lande, at this present, and of late dayes so farre proceeding, that they aduaunced and extolled them selues in open talke and writinges, that they had attayned such knowledge and perfection in Arithmetike, as no englishman the like: Truly me thought that the same reporte not only tended to the

disprayse

dispraise our Countreymen in general: But touched especially some others & me, that had trauailed & written publiquely in the same facultie. For vnto this same effecte they haue of late paynted the corners and postes in euery place within this citie with their peenishe billes, making promise and bearinge men in hande that they coulde teache the summe of that Science in breefe Methode and compendious rules such as before their arriuall hath not bene taughte within this Realme. Whose sayinges to be false, and writings vntrue, if I were ther to requyred by men of authoritie I am well able to prone, and that more is, (be it spoken without enuie, or thirste of praise) euen within this same booke, if it maye please thee to make triall, are generall precepts, & rules to bee founde, such as they can bring forth, neither breefer nor better. But this is no rare thing, since in other matters of greater importance, their attemptes are to perrilous, & their dedes outragious wel deserning restraunct and bamshmente, a-
gainste one of vvhome, verily not of mine owne accorde, but constraynedlye. I haue bene enforced to sharpen my pen, for that

he (as I here say) continueth in disprayse of our nation, saying that weare vnskilfull in those rules that he teacheth, & himself excellet in the knowledg of arithmetik: wherein if true triall might be indifferent iudge, I doubt not but he woulde be founde to haue the least skill of a great many. Of vvhom perhaps if I should write vpon reporte of others, I could say somwhat more, vvhiche would (if it weretrue and he knowne) redounde vnto his vtter discredite, which for this cause I omit to do, least the crime of arrogancie might be thought to rest within me: which I obiect agaynst him. Howbe it, this much I dare affirme, that there are diuers in this honorable Citie, vvho although they aduaunce and extoll not them selues (so malapertly) as these sort of men are accuctomed to doe in all that they professe, yet doo farre surpast them as well in the knowledge of numbers, as in al other kinde of learning and skilfulnes. Another cause also there is of this present edition, as it semeth to me verye iuste and necessarie. For vvhen a certayne vvell willer of mine purposing to employ some time in bettering his knowledge in Arithmetike, throughe

the reading of this present booke did certifie me that he in perusing the same had espied so manye errors committed in the imprinting, that he could gather no truth thereby. I was not a little moued thereat since that by the disordring thereof, neyther the worke retained his true meaning, neither could the Reader attaine his desyred knowledge: and surely no wonnaile for as I am credibly informed, since it passed out of my handes, it hath bene often times printed without the view of a skilfull corrector, vnto the great discredite of the authour. These and such like considerations, urging me forward, and not forgetting the fruite louing Reader, that may grow vnto thee hereby: I haue taken in hande both to amend and augment the same, seasoning (as it were afresh) all three partes of the worke, with diuers questions, and examples, very necessary and profitable; hauing also for thy commodity, added vnto the end of this booke diuers and sundery Tables of the agreement of measures and vvaights of sundry places reduced to an equalitie the one to the other. Vnto thee therefore my re-

quest

queſt is thankefully to accepe the ſame, and in good part, wiſhing well to him that trauaileth for thy benefite, not diſdaining it in reſpect of groſeneſſe of the ſtile, or rudeneſſe of vtteraunce, ſince that this Science requireth not eloquence of writing, but plaineneſſe of teaching, and truth in working of diuers concluſions by numbers only, deſyring thee, if thou be willing to profite hereby, fyrſte friendlye to amende the faultes that haue eſcaped in the printing of the ſame, and then to begin at the entrance of the booke, and ſo orderly proceeding forwarde vnto the ende, not turning vnto the middeſt or laſt part thereof, vntil thou perceaueſt well that which wente before: and ſo doing thou ſhalt not onely attaine to the perfite knowledge of the whole effect, but be able alſo by thine one labour and induſtry to vnderſtand al other bokes of arithmetick whatſoeuer: and thus I bid thee farewell hartilye.

Here followeth the table of all that is contained in this booke.

The diffinition of number in Fol.1.
The first Chapter treateth of Numeration,
The second chapter treateth of addition in whole number. Fol.6.
The 3 chapter treateth of Subtraction in whole number. Fol.10.
The 4 Chapter sheweth of multiplication in whole number. Fo.14.
The 5 Chapter sheweth of Diuition in whole number. Fol 23.
And vnto all these are added there proofes.
The 6 chapt. is of Progressiō Arithmeticall, and Geometrical, with questions of them both. Fol.34.
The 7 chapter teacheth ỹ rule of three called the Golden Rule, and also the backer or contrarie rule of 3. Fol.41

The second part of this booke treateth of fractions or broken numbers.

The first chapter sheweth what a fraction or broken number is fo 49.
The second chapter teacheth all kinds of reduction in fractions, fo. 50.
The thirde chap. treateth of abbreuiation of fractions. Fol 56.
The 4 chapter teacheth Addition in fractions. Fo. 60.
The 5 chapter sheweth of Subtraction in fractions. Fo. 64.
The 6 chapter teacheth of Multiplication in fractions. Fol. 68.
The 7 chapter sheweth howe you may diuide any sum in fractions. Fo. 71.
The 8 chapter treateth of Duplation, triplation, and quadruplation in fractions. fo. 75.
The 9 chapter sheweth all the moles of fractions or broken numbers fo 77.
The 10 chap. teacheth howe to worke diuers questions of Reduction, of Addition, of Subtraction, of Multiplication, and of Diuision in broken numbers. Fol. 79

The third part of this boke treateth *of all manner of necessarie questions which are vsed in the trade of Marchandise.*

The first chapter teacheth all sortes of rules of practise, called briefe rules. Fol. 87.

The 2 chapter teacheth the rules of three composed, being 4 of them in number. Fol. 109.

The 3 chapter treateth of diuers questions of the trade of marchandise, and of the rule of three in fractions. fo. 112

The 4 chapter is of questions of gaynes, and losses in the trade of Marchandise. Fol. 123.

The 5 chapter teacheth diuers questions, of the reducing of breadethes and lengthes of Tapistries, into elles square. Fol. 128.

The 6 chapter sheweth how to reduce the paulmes of Geanes, into yardes, &c. Fol. 131.

The 7 chapter teacheth certayne questions of merchandise, sold by waight, with notable briefe rules to doe the same. Fol. 132.

The 8 chapter teacheth diuers questi-
onsof the trade of marchandise, with
tares and allowances vpon the same.
Fol.135.

The 9 chapter teacheth howe to doe
diuers questions by the double rule of
three, that is by the rule of three, at
twise, or thrise, wherein are notable ex-
amples, and some wrought by ỹ rule of
three compoſed. Fol.138.

The 10 chapter treateth of the rule of
of fellowship or partnership, and also
the rule of partnership betweene may-
sters and their factours, wherein is
taught very necessary questions.
Fol. 145.

The 11 chapter teacheth diuers and
notable questions for to barter wares
for wares, & also to barter wares for
part money, and the rest wares. fo.158

The 12 chapt. treateth of the exchang-
ing of money, from one place to ano-
ther by sundry examples. fol.166.

The 13 chapter teacheth dyuers and
sundrye questions of the rule of Alli-
gation, the which rule is distincte into
2 parts

2 parts with examples on both. fo 169
The 14 chapter teacth the rules of falſe poſition. fol. 181
The 15 chap. treateth of diuers queſtions extraordinary. fol. 189
The 16 chap. treateth of diuers ſpoꝛtes and paſtimes done by number. Fol. 197.

The agreement of the Meaſures and waights, of diuers places in Europa, the one with the other.

FINIS.

The Diffinition of Number.

NVMBER IS AS much to say as a multitude composed of many vnities, as two is composed of two vnities, three is composed of three vnities, foure of foure vnities, fiue of fiue vnities, ten of ten, fourtene of fourtene, fifteene of fifteene, twentie of twentie vnities, &c.

And therefore an vnitie is no number, but the beginning and originall of number, as if you doe multiplie or deuide a vnitie by it selfe, it is resolued into it selfe without any increase. But it is in number otherwise, for there can be no number, howe great soeuer it bee, but that it may continually bee encreased by addinge euermore one vnitie vnto the same.

NVMERATION is the art whereby to expresse and declare the value of anye summe proposed: and is of two kindes, the one gathereth the value of a summe proposed, and the other expresseth anye summe conceaued by due figures and places, for the value is one thing, and the figures are another thing, and that commeth partlye by the diuersitye of figures, but chiefely by the places wherin they bee orderlye sette. And therefore you must firste marke that there are but ten figures and characters whiche are vsed in Arithmatike, whereof nine of them are called signifiing figures, and the tenth is caller a Ciphar, whiche is made like an o, and of it selfe signifieth nothing, but if it be ioyned with any of the other figures, it increaseth their value, and these be they,

1 2 3 4 5 6 7 8 9 0

one, two, three, foure, fiue, sixe, seuen, eyght, nine, ciphre.

Also

Also you shall vnderstande that euery one of these figures hath two values: One is alway certayne and hath hys signification of his owne forme, and the other is vncertayne which he taketh of his place.

A place is called the seate or roome that a figure standeth in, and how manye figures so euer are written in one summe, so many places hath ỹ whole value thereof. And that is called the fyrst place (which is next towarde the right hand) of any summe, and so reckeninge by order towarde the lefte hande, so that that place is last, which is nexte the lefte hande. And contrariwise, when you expresse the value of the fygures in any summe, you muste begin at the left hande, and so recken towarde the right hande.

Euery of these nyne fygures, (which are called signifyinge fygures) hath his owne simple value when hee is founde alone, or in the fyrst place of any summe. In the seconde place towarde the left hand, he betokeneth his

owne value ten times. As, 70. is seuen times ten: that is to say, seuentie. 80 is 8 times 10, that is to say, eyghtie. In the third place euery figure betokeneth his owne value a hundreth times. As 700, in that third place betokeneth a hundreth times 7, that is to say, seuen hundred. In the fourth place euery figure betokeneth his owne value a thousand times. As 7000 is seuen thousand, & 8000, is eyghte thousand. These foure first places must bee had perfectly in minde, yea & that by hart as they say, for by the knowledge of them you may expresse all kinde of numbers, how great soeuer they be.

In the fifte place euery figure betokeneth his own value ten thousand times. As 70000, is ten times seuen thousand, that is to say seuentie thousande. In the fifte place euery figure standeth for his owne value, a hundreth M. times. As 700000, is seuen hundreth thousande. The seuenth place, M. M. times, or a million. As 7000000, is seuen M. M. or seuen millions

millions. And the eyghte place ten M. M. times, or ten millions: so that euery place toward ye left hand, exceedeth the former ten times. But nowe for the easie reading, & readye expressing orderly of any summe proposed, you shall practise this manner following. And for example I propone this number 76543265 8, in the which are ix. places. In the first place is 8, and betokeneth but eyghte, that is to say once his owne value, in the seconde place is 5, and betokeneth ten times fiue, that is fiftie: in the thirde place is 6, and betokeneth an hundreth times fiue, that is vi. C. In the fourth place is 2, and that is two M. And 3, in the fift place, is ten M. times 3, that is xxx M. So 4, in the first place is C, thousande times 4, that is foure C, M. Then 5, in the seuenth place is a M, M, times 5: that is fiue M, M, or rather fyue millions. And 6, in the eyghte place, is fiue times ten millions, that is lx. millions. And last of al vii. in the ix. place. is vii. C, millions

bus. Nowe followeth the practise. I will put a pricke ouer the figure, and so ouer the seuenth, and likewise ouer the tenth. And also ouer the 13, 16, or 19. if you haue so many, and so still leauing two figures betweene euery two prickes, and these roomes from one pricke to an other, are called Ternaries, then you muste pronounce euery three figures from one pricke to an other, as though they were written alone from the rest. And at the ende of their value, adde so manye tymes a thousand, as your nūber hath prickes: (that is to say, if there be but 1 pricke, it is but 1 M: if 2 pricks, one M, M: or els a milion, if 3 prickes, one M, M, M, or a M millions. And so consequentlye of all other figures following.) Then come likewise to the next iii figures, and found them as if they were apart from the rest, and adde to their value so many times thousandes as there are prickes betweene them and the firste place of your whole nūber. And so do by the next .iii. figures

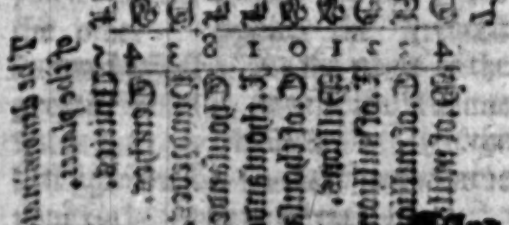
Ternaries.

following, and all the rest likewise: as in example 4 5 1 2 3 4 6 7 8 5 6 7. The firste pricke ouer 8, in the fourth place whiche is the place of a M. the second prick is ouer 4, in the seuenth place, which is the place of a M, M, or one Million, the third prick is ouer the tenth place, whiche is the place of a M, M, M, or of a M millions as in the former example. Then for the expressing of this number by the value of euery figure, according to the place wherein they stand, you shal first beginne at the last prick ouer 1, and take it and the other two figures 5, and 4, whiche are behinde the sayde 1, towarde your lefte hande: and value them alone, and they are foure Cli, M M, M, or else CCCCli, M millions, Then take the other three figures from 1 to the next pricke towarde your right hande, and value them as if they were apart from the other 3 and they are 2 3 4 which do signifie CCxxxiiii millions, or 2 3 4 M M. Then come to

the thirde pricke ouer 8, and take the other two fygures behinde it, and recken them likewyse as if they were alone, and they are sixe Clxxviii M. And last of all come to the other three fygures which remayne, that is 567: and they are fiue Clxvii. Thus the whole summe of these figures, is four Cli. M, two Cxxxiiii, millions, sixe Clxxviii M. fiue Clxvii, as before.

Three kinds of number. Note also that whole number is deuided into three kindes, that is to saye, diget number, article number, and mixt or compounde number. The diget number, is all manner of numbers under ten, which are these nine figures, 1, 2, 3, 4, 5, 6, 7, 8, 9. of the which I haue spoke before. The Article nsiber is any kinde which hath in ye first place a Cipher, as this 0. & they may euer be deuided iust by 10. without any remayne, as these, 10, 20, 30, 40, 50, 100, and all other suche like. *Diget.* *Article.* *Mixt and compound.* The mixt or compounde number contenneth diuers and many articles, or at the least one article, and a diget, as

mple number may bee made a compounde, by putting thereto a diget, euen so likewise euery compounde number, may be made an Article number by adding thereunto a



And

¶ And here followeth a briefe rehersall of the order and Denominatours of the places. And this shal be sufficient for Numeration.

The order of the places.									The denominatours of the places.
Tenthe.	Ninthe.	Eyght.	Seuenth.	Sixte.	Fyfthe.	Fourth.	Thirde place.	Seconde place.	First place.
4	3	2	1	0	1	8	3	4	5
G. of millions.	C. of millions.	T. of millions.	Millions.	C. of thousandes.	T. thousandes.	Thousandes.	Hundredes.	Tenthes.	Unities.

Addition

Addition in whole number.

Chap. 2.

ADdition is as much as to bring togither two summes or more into one, as if there were due to any man 223 li, by some one bu-by: and 334 li, by another, and 431, by another: and you would knowe how many poundes is due to the same man in all, these three summes shall you set downe orderly the one under the other, writing the greatest summe highest, and the nexte to the greatest under it, and the least summe under the laste, in suche sorte that the first figure of the one summe towarde your right hande be directly under the first figure of the other, and the seconde under the seconde, and so forth in order. When you have thus done, draw under the a straight lyne, & then will they stande thus.

223
334
431

Nowe beginne alwayes at the first places towarde your right hande

hande, and put together the three first
fygures of the first places of these thre
summes, and looke what commeth of
them, & write that vnder them
beneath the line, as in saying
3, 4, and 1, beeing put toge-
ther doe make 8: write 8, vn-
der three, as here you see.

And then goe to the second
places of fygures & doe like-
wise: as in saying 2, 3, and 3,
make 8, write 8, vnder 2, as
here you see.

And doe likewise with the fygures
that be in the thirde place, in
saying 2, 3, and 4, are 9, put
nine vnder them, and so will
your whole summe appeare
thus: whereby you maye
perceyue that these three
summes beeing added togeather doe
make 988 li. And this is the arte of
addition accordyng to his simplicitie,
whē the summe of any place doth not
exceede a diget number. But in case
the summe of any one place cannot be

expressed by one figure, but by two, you shall put the first of those figures vnder the lyne, and keepe the other in your minde, for to adde it vnto the first figure of the next place. And if the same next place cannot be auaued but by two figures, you must in lyke manner put the first of those figures vnder the line, and reserue the seconde for the other place next after, and thus must you doe from one place to another vntill you haue come to the laste place, where if it happen you doe finde that the summe be of two figures, you must set them both downe, because it is the ende of that worke: as in this example.

		7	3	4	6	8	2	4 5 6
		4	5	0	9	3	2	3 4 5
		1	3	4	6	7	8	9 1
				4	6	7	2	1 1 2
1	2	0	3	7	5	4	8	1 5

Where the first figures are 3, 1, 5, 6, which added together maketh 15, &

to

for that, that 15, is of two figures, I doe put the first figure 5, vnder the line, and kepe the second figure (which is 1) in my minde, the which I must adde with the nexte figures of the seconde place, that is to saye with 2, 9, 4, and 5: the which together make 21. I write 1, vnder the line for the secõd figure of that addition, that is to saye after 5: and I keepe 2, to be added vnto the third place, the whiche with the other fygures 1, 8, 3, and 4, doe make 18: therefore I put 8 nexte after 1, in the third place vnder the line, & keepe 1 to bee added vnto the fygures of the fourth place, whiche is with 2, 7, 2, 2, the which with the 1 that I kepe, doe make 14: I set downe 4, for the fourth fygure (vnder the lyne) that is to saye, behinde 8: and I keepe 1, to be added vnto ỹ figures of the fift place, the which is 7, 6, 3, and 8, with the 1, that I kepe, maketh 25: I put 5 in ỹ fift place, vnder the lyne next after 4: & I kepe 2 in minde to be added with the fygures of the sixt place, that is

with 6, 4, 9 and 6, and that 2, whiche I keepe, maketh 27: I write downe 7 vnder the line in the first place, and I keepe 2 whiche I adde with the figures in the seuenth place, and they make 13: I put downe 3 vnder the lyne in the seuenth place, and adde 1 vnto the figures in the eyght place, & they are 10: I do put 0 vnder the line in the eighte place, and then I adde 1 vnto the ninth place, that is to saye, with 4 and 7, and they make 12: the which 12 I write at length vnder the lyne, because it is the ende of this addition, and thus it is to be done of all suche lyke. And for the easier vnderstanding of that whiche wee haue spoken of addition, you maye examyne these two other examples following, in the which the first hath these numbers, 3579, 2763, 579, and 28, whiche being added togither, doe make this number 6940, and in the seconde example, doth result this nũber, 5168, by adding togither of these numbers, 4763, 376, 372, 25, as here vnder written

Written.

The numbers to be added.	3570	4763
	2763	3756
	579	2772
The line put betweene.	28	15
The summe of this addition.	6940	11883

Addition of li. s. d.

But if I haue any summes, whiche are compoſed of diuers kindes of denominations, as 25 li. 17 s. 4 d. and 14 li. 13 s. 8 d. and 16 li. 19 s. 7 d. to be added together. I muſt fyrſt ſet downe all the ſayde ſummes the one vnder the other, as here you ſee: placing the title of pounds right vnder ỳ pounds, the ſhillings vnder the ſhillings, and the pences vnder ỳ pences, keeping likewiſe ỳ

li.	s.	d.
25.	17.	4.
14.	13.	8.
16.	19.	7.
57.	10.	7.

dew

due order of their places, in eche denomination. And then I beginne at the least denomination, which are penies: And I say thus: 4 and 8 make 12, and 7 make 19 d: that is 1 s, & 7 d. I set downe 7 vnder the line agaynste the place of penies, and I doe keepe in my minde 1 s, to be added vnto the place of shillinges: This done, I proceede to the sayd place of shillings, saying, 1 s, that I keepe & 7 s, are 8, and 3 are a 11, and 9 doe make 20: I put 0 vnder the line against 9, and do keepe 2 in my mynde, comming then vnto the tens of shillinges, I say 2 that I keepe, and 1 make 3, and 1 make 4, and 1 make 5: whiche are 5 tens of shillings, that is to say 2 li. and 1 ten ouer the whiche 1 I put behinde the 0 towardes my left hande, vnder the tennes of shillings. and I doe keepe 2 li in my mynde, then I come to the place of poundes, and say 2 li. that I kepe, and 5 are 7, and 4 are 11, and 6 do make 17 li, I do set 7 li, vnder the line against 6, and do keepe 1 in my

minde, then comming vnto the tens of pounds, I say 1 that I keepe, and 2 are 3, and 1 are 4, and 1 do make 5: the whiche 5 I write downe vnder the line behind the 7: And so is this addition ended. And then I layde three summes being added togither doe amount to 57 li. 10 si 7 d. And this is to be done of all other summes, or any other denominations.

Other Examples.

325.	12.	6.	3678.	13.	9.
47.	3.	9.	608.	00.	0
38.	18.	7.	400.	17.	8.
5.	00.	8.	256.	18.	8.
316.	15.	6.	4942.	12.	7
			6754.	03.	09.

Of ſubſtraction in whole number.

The. 3. Chapter.

Subſtraction teacheth howe you ſhall ſubſtract one leſſer number from a greater, & ſheweth what there doothe remayne after that you ſhall haue ſubſtracted the ſame. I ſpeake not of the ſubſtracting of one equall number from another equall vnto it, for the facilitie therof requireth no rule.

In ſubſtraction are founde three numbers, the one is the number, from the whiche the ſubſtraction is made. The ſeconde is the number that is to be ſubſtracted, and the third is the number which remayneth after the ſubſtraction is ended. As when I would ſubſtract 25 from 40. The ſayd 40 is the number from the which the ſubſtraction is made, & 25 is the number to be ſubſtracted, and 15 is the number which

remayneth after you haue ended the substraction: here followeth the practise. You shall put the lesser number vnder the greater, in such sorte that euery figure of the one number may answere vnto euery fygure of the other, orderly according to their places; and then draw a right line vnder those two numbers as you did in addition. Then must you beginne at the right hande, and take the first figure of the vndermoste number, and substract that from the first fygure of the vppermoste number ouer it, and that which remayneth you must set vnder neath the line right vnder the figure which you haue substracted: then afterwarde take likewise the seconde figure of the nethermoste number, and abate that also from the second figure of the higher number: the third from the third, and so forth of all the rest till you come to the ende, putting always the remayne of euerye fygure vnder the lyne in his due order and place,

as

as by example. I will substract 2345, from 9876, after þ I haue set them down according to the manner aforesaid. The begynning at the first place next to my right hande, I take first 5 from 6, and there resteth 1: which 1 I set vnder the line right against 5. Secondlye I substract 4 from 7, and there resteth 3: the said 3 I set in the seconde place vnder the line next after 1. Thirdly I substract 3 from 8, & there resteth 5, þ which 5, I put vnder the line in the third place next after 3. Finally I doe substract 2 from 9, and there resteth 7: the which 7 I put vnder the line in the fourth and last place next after 5, and thus is this substraction ended, in the whiche there remayneth 7531.

9876	
2345	
7531	

But when two figures of one likenesse do chaūce to mete, so that the one must be substracted from the other, as if I shoulde substract 7 from 7, there woulde remayne nothing: then must I set a cipher 0 vnder the lyne. But

when the fygure whiche is to be ſubſtracted doth exceede ỳ figure which is ouer him, ſo that it can not bee taken out of the ſame figure. Thē muſt you ſubſtract the vndermoſte figure from 10, & that whiche doth remayne you ſhall adde vnto the ſame figure which is vppermoſt. And the ſumme which reſulteth of them both, you ſhall lette vnder the line. But whenſoeuer you doe borowe any ſuche 10 of the ouer nūber, you muſt adde 1 vnto the next vndermoſte fygure following which is yet to bee ſubſtracted. And there is nothing els to be done in ſubſtraction. Example. I will ſubſtracte 93576, from 4037479, after that I haue placed my two numbers as I ought to do, I do fyrſt ſubſtract 6 from 9, & there reſteth 3, thē I put the 3 vnder the line ryght vnder the 6. And ſecondly I ſubſtract 7 from 7, and there reſteth nothing: I do therfore put a cipher 0 vnder the line ryght againſt 7 in the ſecond

4037479.
93576.
3943903.

seconde place, Then I come to the thirde place where I finde 5, which I cannot substract from the figure ouer it, whiche is but 4, therefore I doe substract it frō 10: as before I taught, and there resteth 5, the whiche I doe adde with the 4 which is ouer it, and that maketh 9: I put 9 in the thirde place vnder the line, for the thirde figure. Fourthly, for the 10 whiche I borrowed, I adde 1 vnto the nexte figure whiche is to bee substracted, whiche is 3, and they make 4: the sayde 4 I doe substract from the ouer figure 7, and there resteth 3, I put 3 vnder the line for the fourth figure. And then I come to the 5 place where I do finde 9, which I cannot substract from the figure ouer it, whiche is but 3, but I doe substract 9 from 10, and there resteth 1, the which figure 1 I doe adde with 3, and they make 4: I put 4 vnder the line for the fifft figure. And here is to be noted, that if it were not for 9 at the last I did borrowe 10, the substraction should haue bene en-

ued. But for because that I muste (for euery such ten that I borrow) alwais adde 1 vnto the nert lower figure following, I must therefore proceede vnto the substraction. And for because that there is no other figure followinge in the lower number, it shall suffice to haue kept the vnitie and to substracte it from the nert ouer figure. But I finde there 0, and therefore I cannot substract 1 frō 0, therfore I substract it from 10 & there resteth 9, whiche I do put vnder the line in the first place: finally, for the ten whiche I borrowed I kepe 1 in my mind. The whiche I do abate from 4, and there remayneth 3, the which 3 I do put vnder the line in the seuenth place after 9, and the operation is thus ended.

An other example.

576084026
485675437
90408589

But if there were manye numbers to be substracted, from one number alone, then must you firste adde those

numbers

numbers togither, according vnto the inſtruction of the Chapter going before, and afterward make your ſubſtraction as is abouesayde. As if I would ſubſtract theſe three ſummes, 123, 234, 456, from 98925, firſte I doe adde the three ſummes into one, and they are 813. The whiche I doe ſubſtract from 98925, and there reſteth 98112.

But if the ſummes bee compoſed of diuers kinds of denominations, then you muſt beginne at the leaſt denomination next toward your right hande, and ſo ſubſtract euery denomination frō his like if it may be ſubſtracted, if it cannot be ſubſtracted, then you muſt borrowe 1 of the nexte denomination toward your left hand, and reduce the ſame into the lyke denomination of that figure which is to be ſubſtracted, then ſhall you ſubſtracte your firſte or leaſt denomination from the ſaide ſumme ſo borrowed, and that figure or number that ſhall remaine, you muſt adde with the vppermoſte number of the

leaſt

least denomination, and set the aggregate vnder the line right against his like. Then the 1 which you did borrow must be added with the nexte figure of the nexte denomination that is to be substracted, and so to proceede with the whole summe that is to bee substracted. Example.

I would substract 15 li, 17 s, 11 d. from 28 li, 13 s, 9 d. I doe firste put downe the great summe, & vnder that the lesser with a line vnder them, as here you see li. s. d. and then I doe beginne 28. 13. 9. at the least denominatiō, 15. 17. 11. which are penies, where 12. 15. 19. I say 11 penies from 9 penies I can not. And therefore I doe borrow 1 s of the next denomination, that is of the 13 s, the which 1 s is 12 penies: then I substracte 11 penies from 12 penies, and there remayneth 1 penie, the which 1 penie I doe adde with 9 penies, and they make 10 penies, the sayd 10 I set vnder the line and do kepe the 1 s in my mind that I borro-

borrowed, then I come to the ſeconde denomination of ſhillinges, where I do finde 17 ſ, then I ſay 1 ſ that I borrowed and 17 do make 18 ſ: the ſayde 18 ſ out of 13 ſ cannot be: therefore I do borrow 1 li of the nexte denomination, that is to ſay, out of the 28 li, and the ſayd 1 li, are 20 ſ. then I ſubſtracte 18 ſ from 20 ſ, and there remayneth 2 ſ. with the which I do adde the 13 ſ, and they do make 15 ſ: the ſame 15 ſ I ſet vnder the line, and I doe keepe 1 li, to be added to the lower place of poundes: then I ſay 1 li that I kepe, and 5 are 6: I ſubſtract 6 li from 8 li, and there remayne 2, I ſet the ſayd 2 vnder the line againſt 5: and laſt of all I come to the tens of poundes, where I do finde 1, then I doe ſubſtract that 1 from 2, & there remayneth 1: which I ſet vnder the line, & ſo I finde there remayneth 12 li, 15 ſ, 10 d, and ſo is to be done of all other like.

Of

Of Multiplication,

Chap. 4.

IN multiplication there are three numbers to be noted, that is to say, the number whiche is to be multiplied, the whiche wee will call the Multiplicand: the seconde is the number by the whiche wee doo multiplie, whiche we wyll name the multiplier, or multiplicatour. And the thirde number is that whiche commeth of the multiplication of the one by the other, which is called the product. As when I would know howe much amounteth 10, multiplied by 9, that is to say howe much are ten times nyne. I finde that they are worth 90. then 10 is the multiplicand, and 9 is the multiplier, and 90 is called the product. So that to multiplie is none other thing, but to finde a number which conteyneth the multiplicande so many tymes, as the multiplier conteyneth vnities: As 10 multiplied by 9, doe make 90, as before

fore is sayde. And 90 conteineth 10 so many times, as 9 conteyneth vnities, that is to say nine times.

In multiplication, it forceth not much which of the two numbers bee the multiplicande, nor which bee the multiplyer. For 10 multiplyed by 9, maketh as many as 9 multiplyed by 10, yet neuertheleſſe it shall bee more commodious that the leſſer number be alwayes the multiplier.

And for that, the multiplication of fygures the one by the other, is the chiefe and neceſſarieſt kind whereby to know how to worke in the multiplication of cõpound numbers, and that euery man hath not the same at ỹ fingers ende, I wyll therefore geue you here certayne eaſie wayes of multiplication of viget numbers. When you would multiplie two ſimple figures, or vigets the one by ỹ other, ſubſtract each of thoſe viget numbers from 10. Then multiplie the two remaines the one by the other, and if the ſumme doo exceede 10, write onely the firſt figure

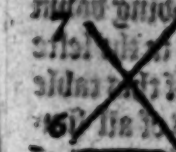
and

and keepe the other to be added to the next operation, which is thus as followeth. Add your two simple figures together: & of ỳ which resulteth of the addition, take only the first figure, vnto the which you must add ỳ vnitie which you did kepe before. And ỳ shall be the second figure of the sum which you do seke. Example. I would multiplie 7 by 6. I take 7 frō 10 & there resteth 3: likewise I substract 6 frō 10, & there resteth 4, then I saye thus, 3 tymes 4 make 12: I write 2 for my first figure, & I kepe 1 in mind: then I adde 6, with 7, & they are 13: of the whiche I cast away the second figure towards my left hand which is 1: and I take onely the first figure 3 whiche is towarde my right hand, vnto the which I adde the vnitie which I kepe, & they make 4, which I write in the seconde place, after 2, & thus I find 42, which is the value of 7 multiplied by 6.

Otherwise, and al commeth to one effect: set down your two diget numbers the one right ouer the other, and

right

right against euery of them towarde the right hande write his owne difference from 10: then multiply the two differences together, the figure which commeth thereof shall you set downe vnder both the differences if it be a diget number that is to say any number vnder 10. But if there be two figures, set downe but the firste, and keepe the other in your minde, afterwardes substract (from one of the two diget numbers) that were firste set down, the difference of the other diget number, that is to say crosselwise. And vnto the remaine adde the figure which you kept before, and that shalbe ỳ seconde number: and thus you shal haue your multiplication. Example of ỳ same figures that is to say of 7 multiplied by 6, the difference of 7 from 10, is 3: and the difference of 6 from 10, is 4. I sette them down crosswayes as you see. And then I saye three times foure are 12: I set downe



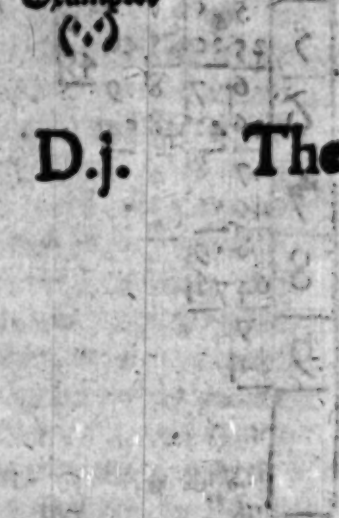
downe 2, and keepe 1 in my mynde, then I substracte 4 from 7, or else 3 from 6, it forceth not from whiche of them, and there resteth alwayes 3: vnto the which I adde the vnitie whiche I keepe in my mynde, and they are 4, which shal be the seconde figure of the multiplication. And thus I finde that 7 multiplyed by 6, maketh 42: as in the other operatiō. This practise hath no place where the 2 diget numbers (doe not exceede 10) by adding them togither, and then is multiplication easie ynough without any rule.

An other way to knowe the multiplication of simple numbers, is by this table following: the vse whereof is thus.

First you shall vnderstand that the numbers frō 1, & so descending downwardes to 9, which are set in the lefte part or hanging margine of this table do betoken the multiplyers of all simple numbers. And the elements or figures beeing put highest, in euerye square roome drawing towarde your

right

right hand, right against euery of the multipliers, doe signifie the multiplycands, which doe appertayne vnto the multipliers of the hanging margyne. And ỹ lower or inferiour numbers in euery square roome, doe betoken the product of that multiplicatiõ, which is made in multiplying the vpper number ouer it, with the figure in the hanging margin, answering directly vnto the sayd square, as by Example.



The Table of Multiplication by all the Digit numbers.

First because I doth not multiplye, I haue set in the vpper Margin the figures from 1 to 9, both in the higher and also in the inferior rowes, for 1 in the hanging Margine, multyplyed by 1, the vpper number in the first square bringeth but 1. So likewise 2, being the higher number in the secõd square of the vpper margine, multiplyed by 1 in the hãging margin bringeth 2 for the lower number in the second square of the vpper margine. For 1 tymes 1, maketh but 1: And 1 times 2 maketh 2. Then 1 times 3 maketh 3, and 1 times 4 maketh 4: and so continuing towarde the righte hande, vntill I come to ỹ figure of 9, which is 1 times 9 maketh 9. Then afterwards I multiplie 2 of the hanging margine by 2, whiche is the vpper number of the square next toward the right hande, & ỹ maketh 4, which is the producte of 2 multiplied by 2, that 4 I set vnder the 2, for 2 times 2 are 4, and 2 tymes 3 maketh 6, then 2 times 4 maketh 8, and 2 times 5 maketh 10, and so

continuing vnto 2 times 9, which maketh 18. The like is to be done with the third row, and so likewise of al the residue.

Example, I would knowe what is the product of 9, multiplyed by 8, I seeke in the hanging margin, the multiplier 8, and amongst the squares directly against 8, drawing toward the right hand, I seeke the multiplicande 9, in the higher rowe, and I finde the product right vnder 9, to be 72, then 72 is the number which commeth of the multiplication of 9 by 8. And so is to be vnderstanded of all the rest of the table, which table must be of all men learned by hart, or as they saye, without booke: which being learned, you shall the better attaine to the rest of multiplication.

To come nowe vnto the practise of multiplication, when you would multiplie two numbers, the one by the other, you must set them down after the same manner as you did in addition, and in substraction, that is to saye, the fyrste

first figure of the multiplyer vnder the firste figure of the multiplicande, the second vnder the seconde, and the third vnder the thyrd, if there be so many, & then drawe a right line vnder them, as in the other operations going before, after this you shall multiplye all the figures of the multiplicand by the multiplier, and set downe the figures (comming of any such multiplication) vnder the lyne, euery one in their due order and place.

Example, I would multiply 123 by 3, that is to say, I would knowe howe much amounteth three times one hundreth, twenty & three. The two numbers beeing placed in suche order as is before sayde, you must beginne towards the right hande: and saye thus, 3 times 3 are 9: wryte downe 9 vnder the line, right against 3, for the firste fygure: secondlye by the same 3, you must multiply the second figure 2, and they make 6, put downe 6 after the 9, vnder the line: Thirdlye by the same

123
3
369

3, you shall multiplye the laste fygure 1, and they are but 3, set downe 3 after 6 for the third and last figure. And thus is the worke ended: whereby you shall fynde that 123 being multiplyed by 3, maketh 369.

But when it happeneth that of the multiplication of one figure by another, the summe which commeth therof shall be of two figures as it happeneth often, then shal you wright down the first figure, and keepe the other figure to be added vnto the multiplication of the next figure.

Example. 6 men haue gayned (euery one of them) 345 Crownes, I woulde knowe howe manye Crownes they had in al. First I multiplye 6 by 5, they make 30. I write 0 vnder þ lyne, and for 30 I doe keepe 3 to be added to the nexte multiplication: Secondly I say, 6 times 4 are 24: vnto the whiche I adde 3, whiche before I reserued, and they make 27. I write 7 in the second place vnder

6
2070

vnder the line, and I keepe 2, to be added to the next multiplication: Thirdly I say 6 times three are 18, vnto the whiche I adde the 2 whiche I keepe, and they make 20, the which I wryte all downe, for because that is the laste worke. And so I finde that 345 being multiplied by 6, doe make 2070. But when the the multiplier is of many figures, you must multiply al the whole multiplicand by euery one of those figures, & write the products euery one orderly vnder his own figure.

Example, I woulde knowe howe many dayes are past from the Natiuitie of Iesus Christe vntill the yeare 1560 full complete. I must now multiply 1560, by 365 dayes, because there are so many dayes in one whole yere, the leape yeares not being reckened, which haue euery one of the 366 dayes.

Therefore first by the	1560
figure 5: I multiplie all	365
the higher figures saying thus, 5 tymes 0, ma-	7800

keth 0 : I write 0, vnder the line for the first figure, and because I keepe nothing for the next place, I proceede and say, 5 times 6 are 30 : I set 0 vnder the line for the second figure, and I kepe 3 to be added to the next multiplication : Thirdly I say, 5 times 5 are 25 : The which with the 3 that I keepe are 28 : I sette downe 8 for the third figure, and keepe 2 to bee added with the next multiplication : Then comming vnto the fourth and laste figure, I say 5 times 1, are 5 : the which with ỹ 2 that I reserued are 7, I put 7 for the last figure of this first worke by the figure 5, with the which figure I haue no more to doe. And therefore I cancel the same 5 with a litle strike thorow it, to signifie that I haue finished with that figure, & for as muche that in multiplication there is always as many simple operations, as the multiplier containeth figures. There resteth yet 2 workes to be made, I cõe therfore vnto the second worke which is ỹ figure 6, by ỹ which I must again multiplie all the figures of the multy-

plicande as I did by 5, and the first fygure (which shall bee produced) I doe put one ranke more lower thē the fygures of the worke now last made by 5 not right vnder the first figure of the multiplier 5, but vnder 6, ꝑ is to saye one degree or place nerer towarde the left hande: and one ranke more lower then the first worke: and I must put afterward euerye of the other figures which commeth of the same multiplicatiō in their order, thirdly I do make the multiplication by the third figure & that which shal come thereof I must set in his ranke, as hereafter shall appeare. And now I neede make no further discourse hereof, because that he which can doe the first multiplication by 5, may as easily doe all the others. It shal therefore suffice to set herevnder ꝑ examples of al ꝑ 3 sundry worke.

	1560	1560
1560	85	365
8	7800	7800
7800	9360	9360
	101400	4680
		569400

Nowe, if you will knowe howe muche all the three worckinges, thus placed doe amount vnto, which in value must be but one number. you must adde all the numbers whiche are come of all the 3 multiplications togither, but not after the same manner as wee haue done in the chapter of addition, the first figure of the firste ranke with the firste figure of the seconde ranke, & so of the thirde, but you muste adde them in the same sort as you shal finde them situated and placed, that is to say, the first figure of the firste ranke alone by it selfe: the seconde of the first ranke, with ý first of the second ranke. The thirde of the firste ranke with the seconde figure of the seconde ranke, & with the first of ý third ranke, & so of all the other as herafter doth appeare.

And thus the 1560	1560
yeares doe contayne	368
fyue hundreth fortie &	7800
nine thousande foure	9360
hundreth dayes, not	4680
counting herein the	569400

dayes

dayes of the leape yeares, whiche are here in number 390, for thē the whole summe of the days should be 569790.

An other Example.

34560
24

207360
172800
138240
69120

84879360

The summe of multiplication is thus, when you would multiplye anye number by 10, you shall onely put one cipher 0 before all the numbers, that is to say, a degree nerer ỳ right hand, as 345 multiplyed by 10, maketh 3450. If you wil multiplie any nūber by 100, adde vnto the same nūber two ciphers thus 00, if by 1000 adde 000. And to bee breefe, when the last figure of the multiplier is 1, and all the reste be ciphers, adde so manye Ciphers to your multiplicande, as there shall bee

found ciphers in your multiplier, but if in my multiplying, the last figure were not 1, but that there were onelye certayne Ciphers in the beginning: and that the other were signifyinge fygures, and lykewyse those of the multiplicand, then shall you put those ciphers apart, and multiplie the signifying figures of the one, by the signifying figures of the other. Then adde vnto the producte of that multiplycation, all the ciphers which you did before put apart. As if I woulde multyply 46000, by 3500. I put aparte the three ciphers of the firste, and the two ciphers of the second numbers which are in all 5 ciphers 00000: And then I multiplie 46 by 35, and therof commeth 1610: Before the which towarde the right hand, I adde the 00000 that I did put aparte, and then the whole product will be 1610000000.

46
35
230
138
1610000000

Of Deuision.
Chapter. 5.

Deuision or partition is to seeke howe manye times one number doth conteyne another, or else howe often tymes one number maye bee found in an other, for in the worke of deuision there are required two numbers to be first knowne, for the fynding out of the thyrde. The fyrst number knowne, is called the deuidende or number which is to be deuided, and that muste bee the greater number: the seconde number is called the deuisor, and that is the lesser. And the thirde number whiche I doe seeke, is called the quotient. As if I would deuide 36 by 9, the deuidend shal be 36: and the deuisor is 9. And for because that 9 is conteyned in 36 foure times that is to say, 4 times 9, doe make 36: The quotient shall bee 4, as if you marke well, howe many times 9 is co-

teyned

teyned in 36, you shall fynde it 4 times, & therfore 4 shalbe the quotiēt.

The Practise.

Write downe fyrst the deuidend in the higher number, and the deuysoure vnderneath, in such sort that the fyrste fygure of the deuisour toward the left hande, be vnder the fyrst fygure of the deuidend, and euery figure of the same deuisor vnder his like, that is to saye ỹ fyrst vnder the first, the seconde vnder the second, the third vnder the thyrde, and so consequently of the other, if there bee so many, which is contrarye to the other three kindes before specified, but yet you must consider further, if all the lower figures of the deuisor, may be takē out of the higher figures of the deuidēd, by the order of substraction or not. The whiche if you cannot do, then must you set the first fygure of the Deuisor (towarde the left hande) vnder the seconde fygure of the deuydende, and so consequently the reste in their due order, if any bee to bee sette

downe

downe euerye one of them vnder his lyke as before is sayd, and then draw a line betweene the deuidende and the deuisor. And at the end of them an other crooked line, behinde the whiche toward the right hand, shall bee sette your quotient. As by this Example following, where the deuisor is but of one figure.

If you would deuide 860, by 4, you must set downe 4 vnder the 8, with a line betweene them, as herevnder you may see.

The deuidend. 860.

Deuisor. 4

And then you must seeke how many times the diuisor 4 is contained in the higher number, that is to say 860, the diuidende aunswering to him, as in this our exãple I must seeke how many times 4 is contayned in 8, in the which I finde it 2 times, then I write down 2 apart behinde the crooked line as here you may see, which shall be the first figure of the quotient to com, secondelye by this fygure 2 (being thus

thus put aparte) I must multiplye the deuisor 4: and vnder the same multiplication, I must sette that number which cōmeth of the same multiplication as 2 times 4 doe make 8, ẏ which 8 I doe set vnder the deuisor 4: Thirdly I doe substracte the producte of the sayde multiplication (of the quotient by the deuisor,) ẏ is to say, 8 from the higher number correspondent to the same, in saying 8 from 8, there remayneth nothing, and then I cancell or strike out that which is don as you see. In these three operations and workes is comprehended the arte of deuision. The which are to be obserued from poynte to poynt, for there is no diuersitie in ẏ fynishing of the same which is thus.

$$\begin{array}{l} \cancel{8}\,60 \\ \hline \cancel{4}\ (2 \\ \cancel{8} \end{array}$$

Now secondly I must remooue my deuisor one place nearer toward my right hād, as in proceeding with one exāple. Here you see I remoue my deuisor 4, whiche was vnder 8, and I set it vnder 6, then I seeke how many

$$\begin{array}{l} \quad 2 \\ \cancel{8}\,\cancel{6}\,\cancel{0}\ (21 \\ \hline \quad 4 \end{array}$$

tymes

conteyned in 6: where I finde it but one time, then I set 1 behinde the crooked line next vnto the first figure of the quotient 2, a degree or place nearer my right hand, afterwarde by this last and newe figure 1, I multiplie the deuisor 4, & that maketh but 4 (for an vnitie, which is but 1, increaseth nothing) I abate therefore 4 from the higher figure 6, and there resteth 2, the whiche 2 I set ouer the 6, and I cancell the 6, for so must I doe when there resteth anye thing, after I haue made the subtraction. Thirdly forasmuch as there yet remaineth another figure in the diuidende, I remoue agayne the deuisor, & I set it vnder the cipher 0. Then I seeke howe manye times 4 is in the higher number which is 20, where I may finde it 5 times, I put therefore 5 behinde the croked lyne for the third and last figure of the quotiēt. Thē by the same 5. I multiplie ỹ deuisor 4, & that maketh 20, the which 20 I abate

2
860 (215
4
20

bate from the higher number, & there resteth nothing: and so is this deuision ended: & thus I haue found that 860, being deuided by 4, bringeth for the quotient 215, that is to saye, that 4 is conteined in 860, two hundred and fifteene times. This is the most easiest working that is in deuision, but that which followeth, appertaineth to the whole and perfecte vnderstanding of the same, when the firste figure of your deuisor towarde your leste hande is greater then ỹ firste of the deuidend, you must not place the firste fygure of your deuisor right vnderneath the firste of the deuidende, but vnder the second figure of the same deuidend, nearer to your right hande, as before is sayde. Therfore whē ỹ deuisor is of many figures, & that you haue to seke how many times it is contayned in the higher number (for the more easier working) you must not seeke to abate the deuisor all at one time, but you muste see and marke how many times the figure of the same toward the left hande is conteined

teyned in the higher number answe-
ring to the sayd number, and then to
worke after the same manner as is be-
fore taught.

Example, I haue 316215 crownes
to be deuided among 45 men, and for
to make my deuision I muste not put
the fyrst figure of the deuisor, which is
4, vnder the fyrste of the deuydende,
which is 3, because that 4 is greater
number then 3, And further, you
knowe that I cannot take 4 out of 3,
wherefore I must sette the 4 vnder the
seconde figure of the higher number,
that is to say vnder 1, and the figure
5, of the deuisor, right vnder the 6, as
here you may see.

So that I must first 316215
seeke how many times 45
45 is cõtayned in 316,
whiche is but parte of the deuidende,
wherefore for the more easie worcking,
I neede but to seeke howe many times
4 is contained in 31. And because I
may haue it 7 times, I put 7 behinde
the crooked line, as is aforesayd: then

by 7, I multiplie al the deuisor 45, & they are 315: ỹ whiche I set vnder the same deuisor, the first figure vnder the fyrste: and the other in order towarde the left hande. Then I substracte 315 from the higher number 316, and of this firste working there remayneth but 1, the whiche I set ouer the 6, and I cancell likewise the 315, and the other fygures 316, and also the deuysor 45: and then it will stand thus, as in the margem.

	1
316	315
45	(7
315	

And when I come to remooue the deuisor, and that I muste seeke howe manye times it is contayned in the higher number, if I see that I cannot finde it there, that is to say, that if the higher number be lesser then the deuisor, as it is in this example, then must I put a cipher in the quotient behinde the crooked line, and if there remayne any figures in the deuidend which are not yet finished: I must remooue the deuisor agayne nere toward my right hand

hande by one place, for to finde a newe figure in the quotient. As in this oure example, for after that I haue remoued the deuisor, I seke howe many times 45: is conteyned in 12, and because I can not haue 45 in 12, I put a 0 behinde the crooked line after 7: then without multiplying or abating, I remooue agayne the deuisor nearer towarde my righte hande, and I seeke how many times 4, (which is the firste figure of the deuisor) is in the higher number, ẏ is to say, in 12, whereas I finde it 3 times: I putte 3 behinde the crooked line for the thirde figure of the quotient: then by the same figure 3, I multiplie the deuisor 45, and thereof commeth 135. And in the number ouer it there is but 121, so that I cãnot take it out of 121, whiche is the lesser number. And therefore heare is to bee

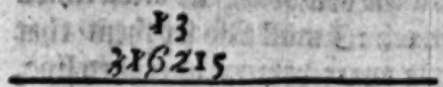
```
   1
 ~~3~~~~1~~~~6~~215
 ------------
   45  (70
```

```
   1
 ~~3~~~~1~~~~6~~215
 ------------
     45(703
    135
```

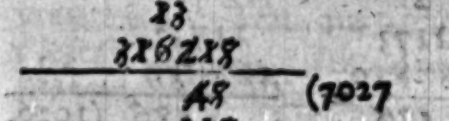
noted, that if it happen that the figure being last founde, whiche is put in the quotient, doe produce or bring foorth a greater number (in multiplying all the deuisor by the same) thē the whiche is ouer the sayd deuisor, you must then make the same figure of your quotient (whiche you doe put downe) lesser by 1, and after that you haue cācelled the firste multiplication, you muste make a newe. And the same must bee done so often times, as (in decreasyng the same,) it may produce a lesser number, or at the least, a number equall to that which is ouer it, as is in the last worke, for because that the deuisor, beeing multiplied by 3, bringeth foorth 135, which amounteth more then 121.

Therefore the same product must bee cancelled, and the figure 3 which I did put in the quotient, must bee also chaunged into a figure of 2. Then by the sayd 2, I must multiplie the deuysor 45, and thereof commeth 90, the which I abate from 121, and there remaineth 31. And then will the summe

stand thus as followeth.



And heare is also to bee noted that the summe which remayneth must bee alwayes lesser then the deuisor. Then finally I remoove the deuisor to the 2 next figures towarde the right hande, and I seeke howe manye times 4 is in 31, for because I fynde it 7 times, I put 7 in ỳ quotiẽt by the which I multiplie the deuisor, and therof commeth 315, the which I abate frõ the higher number of the deuidende, and there remaineth nothing, as here you may see.



But if it happen that after the deui-

sion is ended, there doe remayne anye thing in the deuidend, as often times there doeth: I must also set them that remayne apart behind the croked line, after the entier quotient, and the deuisor right vnder the same remaine, with a line betweene them both. And in this deuisor following, where there remayneth 3 in the last worke. And what the same doth signifie shall be taught vnto you, when I shall treate of fractions, or broken numbers.

i.

```
   11
 4~~6~~7859
 ----------
 4~~5~~~~8~~ (1
```

ii.

```
   11
 4~~6~~7859. (10
 ----------
 4~~5~~~~8~~
```

vi.

```
   2
 1~~1~~73
 4~~6~~7~~8~~~~5~~9
 ----------
 4~~5~~~~8~~
 ~~9~~~~1~~~~2~~ (102.
```

iiii.

```
   ~~2~~
 1~~1~~7~~3~~3
 4~~6~~7~~8~~~~5~~~~9~~ 1/256
 ----------
 4~~5~~~~8~~ (1026.
 2~~7~~~~3~~~~8~~
```

In summe, all the whole practise of deuision

deuision may be kept in remembrance by three letters, that is to say, S, P, and A, which three letters doe signifie to seeke, to multiplie, and to abate.

First I must seeke how many times the deuisor is conteined in the higher number, then by the quotient (whiche I fynde) I must multiplie the deuysor, finally: I must abate the product of the multiplication, from the higher number correspondent to the same, that is to say, out of the deuidende, aunswering to the deuisor.

And further, beside this kinde of working in deuision, The whiche is regular and commune: I will here put another manner of working very easie. The which shall serue for such deuisyons as are more difficil to be wrought. That is to wit, when ỹ number to bee deuided is very great, and the deuisor great also, and it shall serue agayne for to auoyde errour in supputation, and for the placing of fewer figures in the quotient: and consequently it shall saue much

muche labour vnto them which as yet haue not muche studied in this Arte. The practise whereof is thus as followeth.

If you woulde deuide 7894658 by 643. First you shall vnderstande, that although the figure of the deuisor towarde your left hande, may be founde manye times in the higher number, as 10 times, 12 times, or more: yet is it so, that you must neuer put but one figure onlye at a time in your quotient. And you shall at no time put any number in your quotient whiche exceedeth the figure of 9, that is to say, any number being greater then 9, and therfore for to come vnto your practise, wryte downe your deuisor one time, and behinde it towarde your righte hande, draw a line downe straight, and right againste the same deuisor behinde the line toward the right hand, put this figure 1. Then double your sayd deuisor and right against the same which you haue doubled, put behinde the line the figure of 2, This done you shall adde

vnto

vnto the same number that you dou-bled your sayd deuisor, & right against the same product, behinde the line you shal put the figure of 3, and vnto this thirde producte, you must adde agayne your deuisor, and righte agaynste the same producte behynde the line, set the figure 4, And this muste you doe, vntill you come to the fygure of 9, in suche sorte, that euery of the productes doe surmounte so muche his former number, as al the deuisor doth amount vnto, placing at the right side of euery producte behynde the line, the number which signifieth how much he is in order, that is to say, right against the fift producte, you must put 5, and righte against the 6 producte, you must put 6: And so likewise of all the other.

The Example following in the next paage.

Example

Example of the deuisor proponed, 643: Firste of all I write downe 643, & right agaynst ỳ same behinde the line toward my right hand, I put 1: secondly, I double 643, and they make 1286 and right against the sum behind the line, I put 2: thirdly, vnto the same 1281, I adde the deuisor 643, and they are 1929, and righte agaynst the same I sette 3. Fourthly, vnto the sayd 1929, I adde the deuisor 643, and they make 2572: and righte agaynste the same I put 4. And thus must you doe alwayes by encreasing so much euery producte, as the deuisor doeth amounte vnto, vntill you haue so done nine times, as you see in this present table.

643	1
1286	2
1929	3
2572	4
3215	5
3858	6
4501	7
5144	8
5787	9

This being done, you muste sette downe your deuisor vnder the deui-

dend

deuide 7894658, after the same maner as is before declared, ỳ is to saye, 643, vnder the firste three figures of the deuidēd toward your right hande, namelye vnder 789. Then muste you seeke how manye times 643, are contayned in 789: And for to know the same, you muste looke in the foresayde Table, if you maye there finde the same number 789, the whiche is not there. Therefore you must take a lesse number, the nearest to it in quantitie that you can fynde in the table, the whiche is 643, whiche number hath againste it on the righte hande of the lyne, this diget 1: Then take the sayde 1, and put it behinde the crooked line for the firste figure of the quotient.

Then you muste abate 643, from 789, and there will remayne 146, the same shall you put ouer the 789, and cancell the 789: and thus is the firste worke ended. Then set forwarde the deuisor one figure nearer your righte hande, and seeke a newe quotiente as you soughte this, where you finde the

higher

higher number ouer your deuisor to bee 1464. The whiche seeke in the table, and for because you cannot fynde it there, you must take a lesser number the nigheste to it that you can finde, and that is 1286, whiche number hath a gainst it this viget 2. Therefore you muste put 2 for the seconde fygure of the quotient behinde the line, and then abate 1286. from the sayd 1464, and there will remayne 178. Thirdlye remoue forwarde the deuisor as you did before, and you shall finde the higher number ouer it to be 1786, so that the next lesser number to it in your Table is agayne 1286, put therefore once againe 2 in the quotient for the thyrde figure: and abate the sayd 1286, from 1786, so there will remayne 500.

Fourthly, set forward the deuisor, and the higher number ouer it, is 5005, & the nerte lesser number to it, in your table, is 4501 right against the which is 7, put 7 in the quotient for ỳ fourth figure. And after that you haue abated 4501, from 5005, there will remaine

mayne 504. Finally remoue towarde your deuisor vnto the last place, and you shall finde the higher number vner it to be 5048. And the next lesser number to it in your table, is 4501 Therfore set 7 agayne in the quotient for the fift and last fygure. Then substract 4501, from 5048, and there will remayne 547: whiche must be put at the end of the whole quotiēt with the deuisor vnder it, and a line betweene them in this maner following.

(12277. $\frac{547}{041}$

The summe of Deuision.

WHEN you woulde deuide anye number by 10, you muste make awaye the last figure nexte towardes your right hande, and the rest shall be the quotient. Example. As if you would deuide 46845 by 10, take away the 5, and then 4684 shall bee the quotient, and the 5 shal be the number that doeth remayne. Likewise when you woulde deuide anye number by

109,

100. take awaye the two laſt figures towardes your right hande, and if you woulde deuide by 1000, take awaye thꝛee figures, if by 10000, take awaye foure figures. And ſo of all other, whē the firſte figure of the deuiſoꝛ towarde the lefte hande ſhall be onely 1, and the reſte of the ſame deuiſoꝛ beeing but ciphers.

Heere folowe the proofes of Addition, Subſtraction, Multiplication, *and Deuiſion.*

The proofe of Addition.

WHEN you woulde pꝛoue whether your Addition bee well made, conſider the figures of the nūbers whiche be added, euery one in his ſimple valiue, not hauing any regard to the place where he ſtandeth, but to recken him as though he were alone by himſelfe, and then recken them all one after an other, caſting awaye from them the

number

number of 9, as ofte as you may.
And after your discourse made, keepe in minde the same figure which remaineth after the nynes bee taken away: or else set the same in a voyde place, at the vpper ende of a lyne. For if youre addition be well made, the like figure will remayne after that you haue taken away all the nines oute of the total summe of ỹ same addition, as often tymes as you maye there fynde any: as in this aditiõ which heare you see, there remayneth 2 for eche part.

24567	2
5329	
481	
39377	2

The proofe of Substraction.

ADde the number whiche you doe substract, vnto that number which remayneth after the substraction is made, and if the total summe of that addition be like vnto the number from the which the substraction was made,

you haue done well, o-
therwise not, as in this
example doth appeare,
where you see the num-
ber which is to bee sub-
stracted from 5463, is
3584, and the number whiche doeth
remayne, is 1879, the which two sum-
mes beeing added togither, doth make
5463 which is like to the higher num-
ber, out of the which the substraction
was made, as before is sayd.

5463
3584
1879
5463

The proofe of Multiplication.

THe proofe of multiplicatiō is made
by the helpe of deuision. For if you
deuyde the number produced of the
multiplication by the multiplyer, you
shall fynde the higher number whiche
is the multiplicand.

The proofe of Deuision.

TO know if your Deuision be well
made: you must multiplie all the
quotient by your deuisor, and if anye
thing do remayne after your deuision
is made, the same shall you adde vn-

to

to the producte, whiche commeth of the multiplication, and you shall fynd the like number vnto your deuidende, if you haue well deuided, otherwise not.

Of progression.

Chap. 6.

Progression arithmeticall is a breefe and speedye assembling or adding togither of diuers fygures, or numbers, euery one surmounting their other continually, by equall difference, as 1, 2, 3, 4, 5, &c. heare the difference frō the firste to the seconde is but of 1, & so do all the other euery one exceede his former fygure by 1, still to the end. Likewise 2, 4, 6, 8, &c. doe proceede by the difference of 2. Also 3, 6, 9, 12, &c. doe euerye one differ from other by 3. And so maye these numbers continue, infinitelye after this order, in adding vnto ẏ third nūber ẏ quantitie wherein ẏ second doth differ frō the first: likewise adding the same difference vnto the fourth number, also to the fifte, & so vnto al the other: as 1, 4, the difference of the seconde to the firste is 3, adde

Progression Arithmeticall.

3 vnto 4, and they are 3 for the thyrde number. Then add 3 vnto 7, and they make 10 for the fourth number, and so of all other.

Then if you will adde quickly the number of any progression, you shall do thus, first tell how many numbers there are, & write their summe downe by it selfe, as in this exãple, 2, 3, 8, 11, & 14, where the number of their places are 5, as you may see, therfore you must set downe 5 in a place alone, as
5. I haue done here in the margent. The shal you adde the first number and the laste togither, which in this example are 14 and 2, and they make 16, take halfe thereof which is 8, and multiplie it by the 5, whiche I noted in the margent, for the number of the places, and the summe whiche amounteth of that multiplication, is the iuste summe of all those figures added togither. As in this example 8 multiplyed by 5, doe make 40, and that is the totall summe of all the figures. Another example of parcels ỳ are euen as thus, 1, 2, 3, 4, 5,

and

and 6. So that in this example you muste likewise note downe the number of the places, as before is taughte, and then adde together the laste number and the firste, and the summe which commeth of that addition, shall you multiplie by halfe the number of the places which before are noted, and that which resulteth of the same multiplication, is the whole summe of all those figures, as in this former example, where the number of the places is 6, I note the 6 aparte, and then I adde 6 and 1 together: which are the laste and firste numbers, and they make 7, the whiche I multiplie by 3, which is halfe the number of places, & they make 21, & to so muche amounteth all those figures added togither.

Questions done by Progressions Arithmeticall.

1. A Marchant hath sold 100 kersies after this manner following, that is to saye, the firste peece for

1 s, the second peece for 2 s, the thirde for 3 s, and so fourth, rising 1 s in euery peece of kersey vnto the 100 peece. The question is to know how much he shall receiue for the sayd 100 peeces of kerseys, Aunswere it behoueth you to knowe the addition of the 100 termes in this progression: And therefore you must adde 1 s, which is the price of the first peece, with 100 s, whiche is the price of the last peece, and thereof commeth 101: the same 101 you muste multiplie by halfe the number of places, that is to saye by 50, and thereof commeth 1050 s, which being deuided by 20 s, thereof will come 252 li, 10 s, 0 d, which is 2 li, 10 s, 6 d, a peece one with an other. Thus the 100 kerseis are solde by the sayde marchaunte for 252 li, 10 s, 0 d. The practise followeth.

101

1 2 1

105 5050 (252 li. 10 s.

50 2220

5050

Questions

Questions of progression.

2 I woulde laye 100 stones or other thinges in a right line, & euery of the sayde stones to be a iust pace one from an other, and one pace of from the first stone, there standeth a basket. I demaunde howe manye paces a man shall goe in gathering vp the sayde stones, and bearing them vnto the basket, the one stone after the other? Answere. First when he fetcheth the first stone & putteth it into the basket, he maketh 2 paces, for the second 4 paces, for the third 6, for the fourth 8: and so forth vnto ỳ last stone: wherefore the last terme shall be 200: vnto the which you must adde the first terme which is 2, and they make 202, whereof the halfe is 101, the whiche you shall multiplie by 100, whiche is the number of the termes in your progression: or else multiplie 202 by 50, which is halfe the number of places, and therof wil come 10100 paces, and so many paces shal be goe in all.

Questions of Progressions Arithmetical.

3. There is a messenger whiche goeth euerye day 8 myles: an other man foloweth him incõtinently, & he goth the first day 1 mile, the secõd day 2 myle, the thyrde daye 3 myles, and so encreasing his iourney euerye day one myle, by naturall progression The question is to know, in howe manye dayes the seconde man shall haue ouertaken the fyrste. Aunswere, you muste consider that 8 is the middle or halfe as well of the termes, as of the number of the dayes: And therefore double 8, therof cõmeth 16: Subtract 1, and there will remayne 15: and in so many dayes shall he haue ouertaken the firste messenger, the proofe thereof is verye easie. If the seconde had gone the first daye 2 miles, the seconde daye 4 myles, the thyrde daye 6 myles, and so increasing euerye daye his iorney, by 2, in howe many dayes shoulde hee haue ouertaken the firste man, for to doe

doe this, you muſt percepue that 8 is the middle and fourth terme. Therefore double 4, and they make 8, from the whiche ſubſtracte 1, and there remayneth 7, and in ſo manye dayes hee ſhould haue ouertaken him.

Queſtions of Progreſſion Arithmeticall.

4. THere is one man departeth from London to Cheſter, and ſo to Carnaruan, the diſtaunce beeing about 200 myles: He goeth the fyrſte day 1 mile, the ſecond day 2 myles, the thirde day 3: and ſo ordrlye by naturall progreſſion. An other man departeth at the ſame inſtante from Carnaruan to London, and goeth the fyrſte day 2 myles: the ſecond day 4 myles, the thyrde daye 6 miles, and ſo encreaſing euery day 2 miles. The queſtyon is to know in howe manye dayes they two perſons ſhall meete togither.

Aunſwere, Fyrſte you muſt conſider that hee whiche goeth by Progreſſyon naturall

natural, maketh but half the way that the other doeth, ſo that hee ſhall haue made but the one thirde parte of the way at their meeting together. Take therfore the $\frac{1}{3}$ part of 200, and you ſhal haue $66\frac{2}{3}$. Then muſt you ſeeke 2 nũbers, whereof the greater of thẽ, maye be double vnto the other, leſſe 1: and that the one of them being multiplied by the other, the product of them maye be $66\frac{2}{3}$, or little more, ſo that the more do not exceede the value of the greater terme, as here in this queſtion the two neareſt numbers are 12, and $6\frac{1}{2}$, which multiplied the one by the other, doe make 78, which is $11\frac{1}{3}$ more then is $66\frac{2}{3}$: wherefore that day when they ſhould meete togither, the firſt had don but $\frac{1}{3}$ of a myle of his iorney, whiche was vpon the 12 daye, then if yee will know what parte of a day that they did meete, you muſt deuide $\frac{1}{3}$ by 12, and you ſhall finde $\frac{1}{36}$ of a day. Therefore in 11 dayes and $\frac{1}{36}$ part of a daye, that is vppon the twelfth daye, they ſhall meete togither.

5. If

5. IF a manne doe owe mee 1000 Crownes, to bee payde in 20 dayes or termes, by Arithmetical progression. The question is to knowe with what number he shall begin, and continue his progression? Answere: To woe this you muste adde 1 vnto 20, And they make 21, the which you shall multiplie by 10, which is halfe the number of places, and therof commeth 210 and therfore deuide 1000 by 210, and thereof will come $4\frac{16}{21}$, the payment of the first day, and by this number doeth the sayd progression increase, in this sort following, $4\frac{16}{21}$, $9\frac{12}{21}$, $14\frac{8}{21}$, $19\frac{4}{21}$ And so of all others.

A man oweth me 400 li, to be payd in 10 yeares, by progression Arithmeticall, that is to say 40 li at the end of the fyrst yeare, and euerye yeare following 40 li, to the end of 10 yeares, hee offereth to pay me the sayd 400 pound al at one paiment. The question is to knowe at what time hee ought to paye mee the same at one paimente, that I bee

be not interelled in the time? *Answere.* Adde 1 vnto the number of the termes which are 10, & they make 11, wherof you muſt take the halfe, ꝑ is to ſay $5\frac{1}{2}$: Therefore he muſt pay me at 5 yeare & $\frac{1}{2}$ ꝑ ſayd 400 li. al at one time, for that which he payeth before, is equall to ꝑ which remayneth vnpayde.

This rule hath place only when the paymentes are equall. But if it happen that the laſt payment be leſſer then the others, you muſte in this caſe put ꝑ laſt paymente ouer one of the others for to make therof a fraction, the which muſt be added vnto the nũber of the termes, & the halfe of the ſayd ſum being taken ſhall ſhew the time ꝑ the ſayd payment ought to be payd at once, as if the ſayd partie did owe mee but 380 li. to bee paid euery yere 40 li. it is certain that he muſt haue 10 yeares to end the paimentes. And it is true that vppon the 10 day there would remayne but 20 li to be paide: And therefore put 20 ouer 40 in this ſort, $\frac{20}{40}$, and that maketh $\frac{1}{2}$ ꝑ which you ſhal add vnto the number of termes, and you ſhal haue $10\frac{1}{2}$, where-

of the halfe whiche is 5 ½ doeth shewe that he muste paye the sayde 380 li. at 5 yeares ½, all at one payment, and so of all such like.

Progression Geometricall is when the second number contayneth the first in any proportion: as 2, 3, or 4 tymes, and so fooryth. And in like proportion shall the third number contayn the second, and the fourth number conteyne the thyrde, and the fifte the fourth, &c. As 2, 4, 8, 16, 32, 64: here the proportion is double.

Likewise 3, 9, 27, 81, and 243, are in triple proportion.

And 2, 8, 34, 128, and 512, are in proportion quadruple.

That is to say, in the first example, when the proportion is double, euery number contayneth the other 2 times, as 4 conteyneth 2, two tymes, 8 conteyneth 4 two times. &c. In the second example of triple proportion, the numbers exceede eche other three tymes. And the thirde example, the numbers exceede eche other foure times, & thus

you

you see that progression Arithmeticall differeth from progression Geometricall, for that that in progression Arithmeticall, the excesse is onely in quantitie, but in progression Geometricall, the excesse is in proportion.

Now if you will easilye fynde the sum of any such numbers, you shall do thus consider by what number they be multiplied, whether they be multiplyed by 2, 3, 4, 5, or by any other, and by the same number you muste multiplye the last summe in the progression, and from the product of the same multiplication, you shall abate the firste number of the progression. And that which remayneth of the sayd multiplication, you shall deuide by 1 lesse then was ꝑ nũber by ꝑ which you did multiplye, & ꝑ quotient shall shew you the sum of al ꝑ nũbers in any progression. As in this exãple. 5, 15, 45, 135, & 405, which are in triple proportiõ: now must you multiply 405, which is ꝑ last number, by 3 because they are in triple proportion, and they are 1215, from the whiche you

you shall abate the first number of the progression which is 5, & there remayneth 1210, the which you shall deuide by a number lesse by 1 then that was, by the whiche you did multiplye, that is to say, by 2, and you shall fynde in the quotient 605, which is the totall summe of the numbers of that progression. Likewyse 4, 16, 64, 256 and 1024, whiche are in proportion quadruple: therefore you shall multiplye 1024 by 4, and thereof wil come 4096 from the whiche abate the fyrste number 4, & there will remaine 4092. The which you must deuide by 3, and you shall fynde in your quotiente 1364, whiche is the totall summe of that progression, and this shall be sufficient for progression.

A question of progression Geometricall.

A Marchante hath solde 15 yeardes of Satten, the firste yarde for 1 s, the second 2 s, the thyrd 4 s, the fourth 8 s, and so increasing by double progression Geometricall. The question is

is to know, howe muche the ſayde marchant ſhal receiue for ỹ ſayd 15 yardes of ſatten? *Anſwere.* Firſt it is needeful to knowe howe muche the whole numbers of the ſayde progreſſion doe amounte vnto together. And for to doe it you muſt fynde the laſt terme, therefore you muſt ſet downe the ſayde progreſſion vnto the 8 terme, whiche is 128, the which you ſhall multiplye by it ſelf, and therof commeth the fiftenth terme, that is to ſay, 16384: the ſame ſhal you multiplie by 2, for becauſe the progreſſion is double. And thereof will come 32768, from the which you muſt ſubſtract the firſt terme, which is 1. And the reſt beeing 32767, is the iuſt ſumme of the 15 termes, and conſequently the 15 yardes of ſatten ſhall be worth 32767 ſhillinges, the which are 1638 li. 7. s.

The

The vij. Chapter treateth of the rule of three, called the golden rule: or the rule of foure Proportionals.

THE rule of three is the cheefest, the moste profitable, and the moste excelleute rule of all the rules of Arithmeticke. For all other rules haue neede of it, and it passeth all other, for the whiche cause it is sayde that the Philosophers did name it the golde rule, and after others opinyon and iudgemente, it is called the rule of proportion of foure numbers. But nowe in these latter dayes, by vs it is called the rule of three, because it requireth three numbers in his operatiō. Of ẏ which three numbers, the two firſt are set in a certaine proportiō, & in such proportion as they be stablished, this rule serueth to finde out vnto ẏ third nūber, the fourth number to him proportioned, in suche sort as ẏ second is proportioned vnto ẏ firſt. Not for that, that the foure numbers, nor yet ẏ three, are or bee proportionall

cionall, or set in one proportion, but such proportion as is from the first to the second, ought to be from the third vnto the fourth, that is to say, if the seconde number doe conteine the first two tymes or more, so many tymes shall the fourth number conteine the third. And note well that the first nũber & the thirde, in euery rule of three ought and must be alwayes of like denomination, and of one condition and nature. And the second number, & the fourth, must likewise be of one semblance and likenesse, and are dissemblant and contrarye to the other two numbers: that is to say, to the first, & the thirde. And if you do multiply the first number by the fourth, & the secõd number by the third, the productes of your two multiplications will be equall. Likewise if you diuide the one semblante by the other, that is to say, the thirde number by the firste, and likewise the one dissemblante by the other, that is to say, the fourth nũber by the second (whiche are dissemblant

to the other two numbers) your two quotients will also be equall.

The stile and manner of this rule is thus: you muste set downe your three numbers in a certayne order, as by example following shall appeare. And then you shall multiplye the thyrd number by the seconde, and the productе or number y cōmeth of the same multiplication, you must deuide by the first number: or otherwise, diuide the first number by the seconde, and the quotiente therof shall bee your diuisor vnto the thirde number, that is to say, the third number shall be diuided by the quotiēt of the foresaid diuision, y is by the quotiente of the first number diuided by the second. Or otherwise, diuide the secōde number by the firste, and that number which commeth into your quotiēt, you shall multiplye by the thyrde number. And thus shall you haue the fourth number which you seeke for. And thus is your fourth number in suche proportion vnto the thyrd, as your seconde number is vnto the fyrst.

Example.

If 8 bee wooꝛth 12, what are 14 wooꝛth after the rate? oꝛ elſe if 8 require 12, foꝛ his pꝛopoꝛtionall, what will 14 demaunde. The whiche three numbers may conuenientlye bee ſet in ſuch oꝛder as hereafter doth appeare.

If 8 make 12, what will 14 make? you muſt multiplye the thyꝛde number 14, by the ſeconde whiche is 12, and thereof commeth 168 foꝛ the whole pꝛoducte of this multiplication, the which as the rule teacheth, you muſte diuide by the fyꝛſt number, that is to ſay by 8, and thereof commeth 21. And ſo muche are the 14 wooꝛth. This is the way which is moſt vſed.

8.. 12.. 14..

14
12
28
14
168

168 | 21
88

Otherwiſe

Otherwise diuide 8 by 12, whiche you can not doe, for they are $\frac{8}{12}$, wherfore abbreuy $\frac{8}{12}$, and they are $\frac{2}{3}$ for youre quotient, the diuide the thirde nūber 14, by the sayde $\frac{2}{3}$, multiplying 14 by 3, whiche maketh 42: diuide 42 by 2, and you shall haue 21, as before. Otelle diuide the seconde number 12, by the firste number 8, and thereof commeth $1\frac{1}{2}$, the which $1\frac{1}{2}$ you shall multiplie by the thirde number 14, and thereof will come 21, as is about sayde, and thus must you doe of al other. And although that the numbers of this rule may bee founde in three differences, for sometymes they are whole numbers and broken togither, sometymes broken number, & broken togither, and sometimes all whole numbers, if they be whole numbers, you muste doe none otherwise, then you did in the laste example. But in case they be broken numbers, or broken and whole numbers togither, the maner and waye

2
4
8
12
6
3

Example.

If 8 bee wooꝛth 12, what aꝛe 14 wooꝛth after the ꝛate? oꝛ elſe if 8 ꝛequiꝛe 12, foꝛ his pꝛopoꝛtionall, what will 14 demaunde. The whiche thꝛee numbeꝛs may conuenientlye bee ſet in ſuch oꝛdeꝛ as hereafter doth appeaꝛe.

If 8 make 12, what will 14 make? you muſt multiplye the thyꝛde numbeꝛ 14, by the ſcconde whiche is 12, and thereof commeth 168 foꝛ the whole pꝛoducte of this multiplication, the which as the rule teacheth, you muſte diuide by the fyꝛſt numbeꝛ, that is to ſay by 8, and thereof commeth 21. And ſo muche are the 14 wooꝛth. This is the way which is moſt vſed.

8.. 12.. 14..

168 | 21
88

14
12
28
14
168

Otherwiſe

Otherwise diuide 8 by 12, whiche you can not doe, for they are $\frac{8}{12}$, wherfore abbreuy $\frac{8}{12}$, and they are $\frac{2}{3}$ for youre quotient, thē diuide the thirde nūber 14, by the layde $\frac{2}{3}$, multiplying 14 by 3, whiche maketh 42: diuide 42 by 2, and you shall haue 21, as before. Or else diuide the seconde number 12, by the firste number 8, and thereof commeth $1\frac{1}{2}$, the which $1\frac{1}{2}$ you shall multiplie by the thirde number 14, and thereof will come 21, as is aboue layde, and thus muste you doe of al other. And although that the numbers of this rule may bee founde in three differences, for sometymes they are whole numbers and broken togither, sometymes broken number, & broken togither, and sometimes all whole numbers, if they be whole numbers, you muste doe none otherwise, then you did in the laste example. But in case they be broken numbers, or broken and whole numbers togither, the maner and waye to

2	
4	
8	
12	
6	
3	

doe them, requireth a certayne variation and difficultie, according to the varietie of the numbers that shall bee proponed: the which operation easilye to doe, and vnuariable, this rule teacheth.

The three numbers being set down according vnto the order of the whole numbers aforesayd, without anye broken number, let 1 be put alwayes vnderneath euery whole number with a line betweene them, fraction wise, as thus $\frac{1}{}$, and that 1 is denominator to euery such whole number. But when you haue whole number and broken togither, they must be reduced and added with their broken number, and if there be broken number without anye whole number, the same broken must remayne in their estate.

The rule of 3 in fractions.

This being done, you shall multiplie the denominator of the first number, by the numerator of the seconde

and

and multiplie the producte thereof a-gayne by the numerator of the thyrde number. And so shall you haue the dy-uidend, or number whiche must bee di-uided, then multiplie the numerator of the first number by the denominator of the seconde, and multiplye agayne the product thereof, by the denominator of the third number, & that whiche com-meth of this multiplication shall bee your diuisor. Then diuide the number which is to be diuided by the deuisor, and you shall fynde the fourth number that you seke, Of the which maner and fashions of the rule of three, are diuers kindes, whereof the first is of 3 whole numbers, as was the last example, and here followeth the seconde.

If 15 pounds dos buy me 2 clothes, howe many clothes will 300 pounds buy me, of the same price that the two clothes did cost: Set downe your three numbers thus.

The Example followeth in the next page.

li.	Clothes.	li.		
15.	2.	300.	£	
		2	ßßß	
		600	188	(40
			1	

And then as you see, you must multiplie the third nũber, which is 300 li. by 2, which is the second number, and thereof commeth 600, the whiche 600 you muste deuide by the fyrste number 15, and you shall finde in your quotient 40, which is 40 clothes, and so many clothes shall you buy for 300 li, as appeareth by practise heere aboue written. And here you must mark that the first number, and the thyrd in this questyon be of one denomination, as before I haue declared, & lykewise the second and the fourth numbers, which you haue founde, are of one semblaunce and likenesse, but in case that the fyrste number and the thirde in any questyon bee not of like denomination, you must (in working) bring them into one denomination, or nature, as in this example

ample following. If 12 Nobles doe gaine me 6 french crownes, howe manye frenche Crownes will 48 pounds gaine me? Here you see that the denomination of the firste number is Nobles, and the Denomination of the thirde is pounds: wherefore, before you doe proceede to worke by the rule of three, you must first turn the pounds into nobles, in multiplying 48 pounds by three Nobles, and they make 144 nobles, for that there is in euery pound of mony 3 nobles, or otherwise if you will, you may bring the fyrst number being 12 Nobles, into pounds, by deuiding them by three, and thus shall your first & third numbers be broughte into one denomination, then shall you sette downe your 3 numbers in order thus.

If 12 nobles doe gaine me 6 french Crownes, what shall 144 Nobles gayne? the whiche 144 are the nobles which are in 48 li. Then multiplye the thirde number 144, by the seconde number 6, and thereof commeth 864,

the

the whiche you muste deuide by 12 nobles, and thereof commeth 72. French Crownes.

And so many frenche Crownes will the 144 Nobles gayne me.

Nobles.	Crownes.	Nobles.
12	6.	144.
144	72	Nobles.
6	864	(72
864	12	

There is yet a more exacte waye, whereby to worke in this rule of three which is thus. You muste marke if the thirde and firste numbers in the rule of three, may be both deuided by one like diuisor, the whiche after you haue diuided them, you shall write downe eache of the quotients ouerlye in the sayd rule of 3, euery one of them in his owne place, as though those were 2 of the numbers of your question, and not changing the middle number, that

is

is to say the seconde, And thus, if 50 Crownes doe buy mee 44 yardes of cloth, how many yardes shall I haue for 120 Crownes? Here you may see that the thirde and the fyrste numbers may be deuyded by 10, whiche in the third number is founde 12 tymes, and in the fyrst 5 tymes, wherfore you shall put 12 for the thyrde number, in the rule of three, in steede of 120, & 5 for the first number in stede of 50, and let 44 remayne stil in the middest for ỳ second number, after this sort as followeth, and then worke by the rule as before.

Crownes.	*Yardes.*	*Crownes.*
5	44.	12.
	12.	
	88.	
	44.	
	528	(105 2/5.
	528	

You must multiplye 44 by 12, and thereof commeth 528, diuide the same 528 by 5, and you shall finde in youre quotient 105 2/5 and euen so manye yardes

yardes should you haue found, if you had wrought the rule of three, by the firste numbers proposed. There is yet certayne other varieties, in working by the rule of three, but for that they requyre the knowledge of fractions, & because they are not so easie as this firste way, which is common, therefore contente your selues with this same, vntil you haue learned the fractiõs, the which by Gods helpe I intende to set forth in the second part of this booke, incontinently after that I haue fyrste taught you the backer rule of three.

Of the backer Rule of three.

The backer rule of three is so called because it requireth a contrarye working to that, which the Rule of three directe doeth teache, whereof I haue nowe treated. For in the direct rule of three, the greater the thirde number is so much the greater will the fourth be. But here in this backer rule, it is contrariwise, for the greater the third nũber

ber is, so muche lesser will the fourth be. Then, whereas in the rule of three direct, the third number is multiplied by the seconde, and the product thereof diuided by the fyrst. Heare you muste multiplie the seconde number by the first, & diuide the producte of the same by the thirde, and the number whiche commeth in the quotient, aunswereth to the question. For such practise commeth often times in vse: In such sorte that if you shoulde worke the same by the rule of three direct, and not to haue a regarde vnto the proposition of the question, you should then commit an euident and open errour.

Example.

If 15 shillinges worth of Wyne will serue for the Dyuinary of 46 men when the Tonne of wyne is worthe 12 poundes: for howe many men will the same 15 shillinges worth of wyne suffice, when the Tonne of wyne is worth but 8 poundes: It is certayne

tayne, that the lower the price is, that the Tonne of wyne doth coste, and so many more persons will the sayde 15 shillinges in wine suffice. Therefore, set downe your numbers thus: if 12 pounde suffice 46 men, for how many men will 8 pounde suffice, you muste multiplie 46 by 12, and thereof commeth 552, the whiche 552 you shall diuide by 8, and thereof commeth 69, and vnto 69 men, will the sayd 15 shillings worth in wine suffice, when the Tonne of wine is worth but 8 pound, as hereafter doth appere by practike.

Lib.	*Men.*	*Lib.*	
12.	46.	8.	
	12		552 (69
	92.		88
	46.		
	552.		

2 Likewise a messenger maketh a iourney in 24 dayes, when the daye is but 12 howers long, in howe manys dayes

dayes shall hee make the same iourney, when the daye is 16 houres in length? Here you muste perceyue that the moze howers there are in a day, the fewer dayes will the messenger bee in going his iourney. Therefoze write down your numbers thus as here you may see.

Houres.	*Dayes.*	*Houres.*	
12.	24.	16.	4
	12.		12
	48.		288 (18.
	24		188
	288.		1

And then multiplie 24 dayes by 12 howres, and thereof commeth 288: diuide the same 288, by the thyrde number 16, & you shall finde 18, the whiche is 18 dayes, and in so manye dayes will the messenger make his iorney, when the day is 16 howers long.

Likewise when the bushel of wheat doth cost 3 shillinges, the penye lofe of bread weigheth 4 pound.

I demaunde what the same penny-
lofe shall weigh, when the Bushell of
wheate is worthe but two shillinges:
Here is to be considered, that the bet-
ter cheape the wheate is, the heauier
shal the penny lofe weigh, and therfore
write downe your 3 numbers thus.

Shil.	*lib.*	*Shil.*	
3.	4.	2.	
3.		12	*Lib.*
12.		2	(6.

Then multiplie 4 lib. which is the
second number, by the firste number
3, and they make 12, the which 12 you
shall diuide by the thyrde number and
thereof commeth 6li, and so much must
the peny lofe of bread weigh, when the
bushell of wheate is worth but 2 shil-
linges, as may appeare. And nowe ac-
cording to my former promise, shall
followe the seconde parte of Arithme-
ticke, whiche teacheth the working by
Fractions.

Here endeth the first part of
Arithmetick.

The seconde parte of Arithmetike, whiche treateth of Fractions or broken numbers.

The firste Chapter treateth of Fractions or broken numbers, and the difference thereof.

A Fraction or a broken number, is as much as a parte or manye partes of 1, whereof there are two numbers with a lyne betweene them both, that is to saye, þ one which is aboue the line is caled the numerator, & the other vnderneth the line is called the denominator, as by example, three quarters is called a fraction, which must be set down thus $\frac{3}{4}$, wherof 3 whiche is the higher number aboue the line is called the numerator, and 4 whiche is vnder the lyne, is called the denominator. And it is alwayes conuenient that the numerator bee lesse in number, then the denominator. For if the Numerator and the

tor, and the denominator be equal nũbers, then shall they presente a whole nũber thus, as $\frac{1}{1}, \frac{2}{2}, \frac{4}{4}$, which are whole numbers, by reason that the numerators of these, and all such like, maye be deuided by their denominators, and their quotientes will alwayes bee but 1. But in case that the numerator of any fraction doe exceede his denominator, then it is more then one whole, as $\frac{19}{16}$, is more then a whole number by $\frac{1}{16}$. And this is commonlye called an improper fraction, other definition doeth not hereunto appertayne. Furthermore it is to bee vnderstoode that when the numerator is iuste the halfe of the denominator, thē the same broken number is the iuste halfe of 1 whole, as $\frac{6}{12}$. $\frac{7}{14}$. $\frac{8}{16}$. $\frac{9}{18}$. and other like, are the halfes of one whole number, whether it be of money, of measure, of weight, or any other thing: whereof doth grow and come foorth 2 progressions naturall, the one progreding by augmenting or increasing, as these.

$\frac{1}{2}$ $\frac{2}{2}$ $\frac{3}{2}$ $\frac{4}{2}$ $\frac{5}{2}$ $\frac{6}{2}$ $\frac{7}{2}$ $\frac{8}{2}$ $\frac{9}{2}$ $\frac{10}{2}$ &c.

And they doe proceede infinitelye, & will neuer reache to make a whole number, thus, $\frac{1}{1}$. And the other progression, doeth progredye by diminishing or decreasing, as thus.

$\frac{9}{10}, \frac{8}{9}, \frac{7}{8}, \frac{6}{7}, \frac{5}{6}, \frac{4}{5}, \frac{3}{4}, \frac{2}{3}, \frac{1}{2}$, &c.

And these doe proceede infinitelye & shall neuer come to make a 0 whiche signifieth nothing, but shall euer retayne some certayne vallue of an vnity whereby it doth appeare that Fractions or broken numbers are infinite.

The second Chapter treateth of the *reducing or bringing together of two Fractions or many, of diuers denominations, vnto Fractions of one like denomination.*

REduction, is as muche as to reduce and bring together, or to put 2 or manye numbers, being of dyuers denominations the one frō the other, into fractions of one denomination,

in reducinge them vnto a common denominator, and the reason thereof is, For bicause the diuersitie and difference of the broken numbers do come of ỹ denominators part, or of diuers denominators, and for the vnderstanding hereof, there is a generall rule whose operation or workinge is thus: Multiplie the denominators of the fractions, the one by the other, and so you shall haue a new denominator cõmon to all the fractions; the whiche denominator you muste diuide by the particular denominators of euerye of the sayde fractions, and multiply euery quotient by his owne numerator, & so you shall haue new numerators, for the numbers which you would reduce, as appeareth by this example folowing.

Reduction in common denomination

1. If you will reduce $\frac{1}{2}$ and $\frac{2}{3}$ together, firste make a crosse betweene the 2 fractions, as here you see, and then you

you must multiplye the two denominators the one by ẏ other, that is to saye 3 by 5 maketh 15; which is your commõ denominator, set that vnder the crosse, then diuide 15 by the denominator 3, and you shal haue 5, which multiplie by the numerator 2, and you shall finde 10, set that ouer the $\frac{2}{3}$, and they are $\frac{10}{15}$ for the $\frac{2}{3}$. Afterwardes diuide 15 by the denominator 5: and thereof commeth 3, the which multiply by the numerator 4, and you shall finde 12, whiche set ouer the heade of the $\frac{4}{5}$, and they make $\frac{12}{15}$ for the $\frac{4}{5}$: as appeareth more playner aboue in the margine.

$$\begin{array}{ccc} 10 & & 12 \\ \hline 2 & & 4 \\ \hline \frac{2}{3} & & 5 \\ & 15 & \end{array}$$

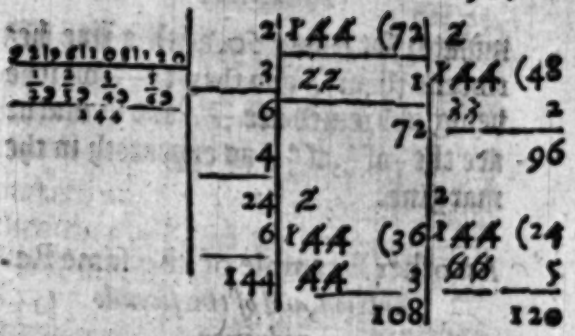
2. If you will reduce $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$, togither, you must multiplie all the denominators the one by the other, that is to saye, 2 by 3 maketh 6: then 6 by 4 amounteth to 24. Last of all 24 by 6, and thereof commeth 144, for the commõ denominator. Thẽ, for ẏ fyrste fraction

tion which is $\frac{1}{2}$, diuide 144 by the denominator 2, and thereof commeth 72, the which multiplye by the numerator 1, and it is still 72, set that ouer the $\frac{1}{2}$ & that is $\frac{72}{144}$, for the $\frac{1}{2}$: Then deuide 144 by the second denominator 3, & thereof cōmeth 48, the which multiplye by the second numerator 2, & they are 96 whiche set ouer the $\frac{2}{3}$, and they make $\frac{96}{144}$, for the $\frac{2}{3}$: Then deuide 144 by the thirde denominator 4, and thereof commeth 36, the whiche multiplye by the thyrd numerator 3, and they make 108: which sette ouer the $\frac{3}{4}$, and they are $\frac{108}{144}$ for the $\frac{3}{4}$.

Finallye diuide 144 by the last denominator 6, & thereof commeth 24: The which multiply by the last numerator 5, and thereof commeth 120. Which set ouer the $\frac{5}{6}$, and they are $\frac{120}{144}$, for the $\frac{5}{6}$, as appereth heare by practise.

The Example followeth in the next page.

72 | 96 | 108 | 120	2	144 (72	2
$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$,	3	22 1	144 (48
144	6	72	33 2
	4		96
	24	2	2
	6	144 (36	144 (24
	144	44 3	66 5
		108	120



Reduction of broken numbers of broken.

3. If you will reduce the broken of broken togither, as thus, the $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$, you must multiplye all the numerators the one by the other, to make one broken number of the three broken nũbers, that is to saye, 2 by 1 maketh 2, and then 2 by 4 maketh 8: whiche 8 is your numerator. Then multiply the Denominators the one by the other that is to say, 3 by 4, maketh 12, and then 12 by 5 maketh 60 for your deno-

8

2, 1, 4,

3, 4, 5,

60.

minator, set 8 ouer 60, with a line betweene them, and they be $\frac{8}{60}$, whiche being abbreuied are $\frac{2}{15}$, and so muche are the $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, as appeareth in the margine.

An other Example of the same Reduction, and of the seconde reduction.

If you will reduce $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, the $\frac{3}{4}$ of $\frac{1}{7}$: And the $\frac{1}{2}$ of the $\frac{1}{2}$, of the $\frac{3}{5}$ of $\frac{4}{5}$. First it behoueth you of euery partie of the broken numbers, to make of eache of them one broken: as by the thirde reduction is taughte, that is to saye, in multiplying of numerators by numerators, and denominators by denominators: First for the firste part which is $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you muste as is before sayde multiplie 2 by 1, and then by 4, and you shall haue 8 for the numerator, likewise multiplie 3 by 4, and the producte by 5, and you shall haue 60 for the denominator, so they make $\frac{8}{60}$, which being abbreuied are $\frac{2}{15}$ for y firste

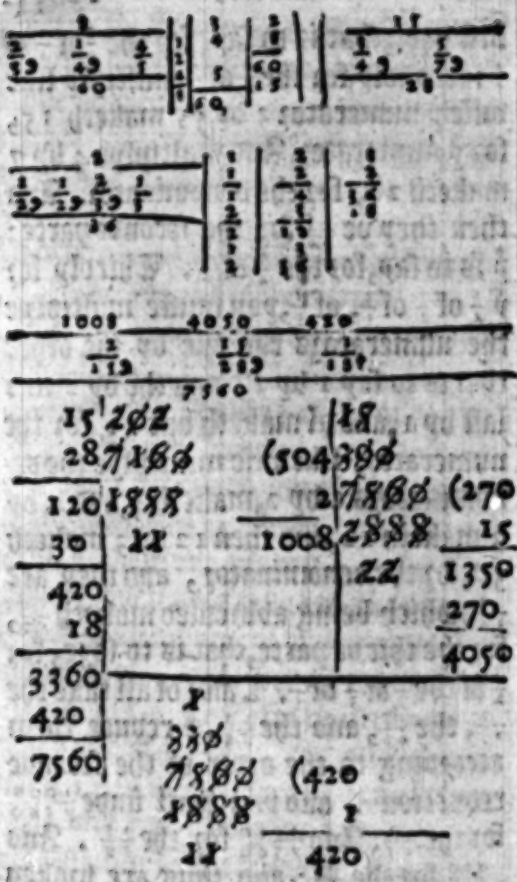
first part, that is to say, for the $\frac{3}{5}$ of $\frac{1}{4}$ of $\frac{4}{7}$: secondly for the $\frac{1}{4}$ of $\frac{1}{7}$ multiply likewise ỹ numerator 3 by 5, maketh 15, for ỹ numerator. And multiplye 4 by 7 maketh 28, for the denominator. And then they be $\frac{15}{28}$ for the seconde parte: ỹ is to say, for the $\frac{1}{4}$ of $\frac{1}{7}$. Thirdly for ỹ $\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{2}{3}$, of $\frac{1}{11}$, you muste multiplye the numerators the one by the other that is to say 1 by 1, and thẽ by 2 and last by 1, and al maketh but 2, for the numerator, likewise multiplye the denominators 2 by 2, maketh 4, and 4 by 3 maketh 12, and then 12 by 3 maketh 36, for the denominator, and they are $\frac{2}{36}$, which being abbreuied maketh $\frac{1}{18}$, for the thirde parte, that is to saye, for $\frac{1}{2}$ of the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{1}{11}$. Laste of all take the $\frac{2}{15}$, the $\frac{11}{28}$, and the $\frac{1}{18}$, & reduce them accordyng to the order of the seconde reduction, and you shall finde $\frac{1008}{7560}$ for the $\frac{2}{15}$. And $\frac{4050}{7560}$ for the $\frac{11}{28}$. And $\frac{420}{7560}$ for the $\frac{1}{18}$: and thus are broken numbers of broken, reduced, as appeareth by practise.

8		3	2		15		
2/39	1/49	4/5	1	4	8	1/49	5/79
			2	5	60		
			4		15		
			8	60			
	60					28	

2			1	2	1		
1/29	1/29	2/39	1/3	1	2	1	2
				1	4	3	3
				2	1	1	1
				2	12	16	18
	36			1	3		
				2	36		

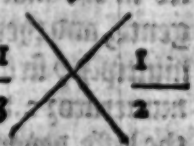
1008	4050	420
2/159	15/289	1/181
	7560	

15	202		18	
28	7160	(504	300	
120	1888	2	7560	(270
30	11	1008	2888	15
420			22	1350
18				270
3360				4050
420	1			
7560	330			
	7560	(420		
	1888	1		
	11	420		

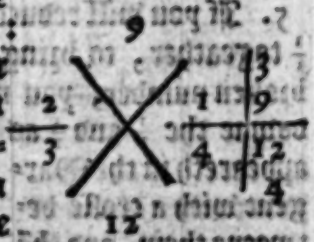


Reduction of broken numbers, and *the partes of the same.*

5. If you will reduce $\frac{1}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$ togeather, to bring them into one broken number, you muste firste sette downe the $\frac{1}{3}$ and $\frac{1}{2}$ as appeareth in the Margent with a crosse betweene them, and then multiplye the two denominators, the one by the other, that is to say, 2 by 3, maketh 6, set that under the crosse, then multiplye the fyrste numerator 1, by the laste denominator 2, and that maketh 2: vnto the which adde the laste numerator 1, and they be 3 whiche set aboue your crosse, so you shall finde that the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, doe make $\frac{1}{6}$, which being abbreuied doeth make $\frac{1}{3}$: whiche is as muche as the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, beeing reduced into one fraction. Likewise if you will reduce the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, you muste doe as before, set down the $\frac{2}{3}$ and $\frac{1}{4}$, with a crosse betweene



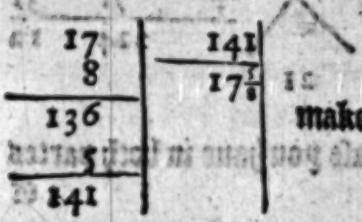
betweene them, thē multiplie the two denominators the one by the other, ẏ is to saye 3 by 4, maketh 12: which set vnder ẏ crosse, as you see in the margente, and then multiply ẏ firste numerator 2, by the laste denominator 4, and thereof commeth 8, whereunto adde the last numerator 1, and that maketh 9, which 9 set ouer the crosse, so shall you finde that the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, are worthe $\frac{9}{12}$, the whiche abbreuied doe make $\frac{3}{4}$, as appeareth by example, in the margine.



Reduction,

Reduction of whole numbers and broken together into a Fraction, the which fraction is called an improper Fraction.

If you will reduce whole number & broken into broken, you shall reduce the whole nũber into brokẽ, as by this example may appeare, if you will reduce $17\frac{1}{8}$ into a broken number, fyrste you must multiplye the whole number 17 by the denominator of the broken, whiche is 8, in saying 8 times 17 doe make 136, vnto the whiche you must adde the numerator of $\frac{1}{8}$, whiche is 5, and all amounteth to 141, whiche set ouer $\frac{1}{8}$, with a line betweene them, and they will bee $\frac{141}{8}$ so muche is $17\frac{1}{8}$ worth in an improper fraction, as appeareth here by practise.



In

In case you haue whole number and broken, to be reduced with broken, you must bring the whole number into his broken, in multiplying it by the denominator of the broken number going therewith, and adde therevnto the numerator of the sayde broken number, as in the last example is declared, and then reduce that broken number with the other broken, as heare appeareth, by this example. Reduce 10, $\frac{3}{4}$ and $\frac{4}{7}$ togither, firste bring 10 $\frac{3}{4}$ all into thirds, as it is taughte by the firste reduction, and you shall finde $\frac{123}{12}$: then reduce the $\frac{123}{12}$ and $\frac{4}{7}$ together, by the first reduction, and you shall finde $\frac{1134}{84}$ for the $\frac{123}{12}$: and $\frac{132}{84}$ for $\frac{4}{7}$ as appeareth here by practise.

Also in case you haue in both partes of

of your reduction, as well whole numbers as broken, you must alwayes put the whole of eache part into his broken as by the 6 reduction is taught.

Example.

If you will reduce $12\frac{1}{4}$ with $14\frac{3}{11}$ to bring them into one denomination fyrste bring the $12\frac{1}{4}$ all into fourthes, and you shall finde $\frac{49}{4}$: then likewise reduce $14\frac{3}{11}$ al into thyrds, and you shal haue $\frac{157}{11}$, for the $14\frac{3}{11}$: then reduce $\frac{49}{4}$ and $\frac{157}{11}$ togither by the order of the first reduction, and you shall finde $\frac{539}{44}$ for the $\frac{49}{4}$. And $\frac{1764}{132}$ for $\frac{157}{11}$, as here by practise both playnly appeare.

$$\frac{49}{12\frac{1}{4}} \quad \frac{44}{14\frac{3}{11}} \quad \frac{147}{\frac{49}{4}} \qquad \frac{176}{\frac{157}{11}}$$

12

The thirde Chapter teacheth of abbreuiation of *one broken number into a leſſer broken.*

Abbreuiation is as much as to ſet downe, or to write a broken number by figures of leſſe ſignification, and not diminiſhing the vallue thereof. The whiche to doe, there is a rule, whoſe operation is thus, diuide the numerator, and likewiſe the denominator by one whole number, the greateſte that you may finde in the ſame broken number, and the quoticnte of that numerator, make it the numerator, and likewiſe of that of the denominator, make it your denominator, as by example.

1. If you will abbreuiate $\frac{54}{81}$, you ſhall vnderſtand that ỳ greateſt whole number that you maye take, by the which you may diuide the numerator, and the denominator is 27, whiche is the halfe of the denominator, & that is a whole number for you cannot take a whole number out of the denomina-

tor

toz 81, which will diuide both the numeratoz & denominatoz, but that there will bee eyther moze oz lesse then a whole number, therefoze if you diuide. 54 by 27, you shall fynde in the quotient 2 foz the numeratoz: likewise if you diuide 81 by 27 you shall haue in the quotient 3 foz the denominatoz, then put 2 ouer the 3, with a lyne betweene them, and you shall fynde $\frac{2}{3}$, and thus by this rule the $\frac{54}{81}$ are abreuied vnto $\frac{2}{3}$, as appeareth in the margine, and so is it to bee vnderstood of al other.

54 (2
27

2
3

81 (3
27

The forme and maner how to fynd *the greteſt number by the which you may wholy deuide the numerator, and denominator, to the end you may abbreuiate them, is thus.*

Firſt diuide the denominator by his numerator, and if any number doe remayne, let your deuiſor be deuided by the ſame number, and ſo you muſt continue vntill you haue ſo often tymes diuided, ỳ there may nothing remayne then is it to be vnderſtoode, that your laſt deuiſor, (whereat you did ende and that 0 did remayne after your deuiſion) is the greateſt number, by the which you muſt abbreuiate, as you did in the laſt example. But in caſe ỳ your laſt deuiſor be 1, it is a token that the ſame number cannot be abreuied to any lower ſractiõ thẽ you finde it at the firſt. Example of $\frac{54}{81}$: diuide 81, which is the denominator by 54 which is his numerator, and there reſteth 27, then diuide 54 by 27, and there remaineth a 0, which is nothing, wherefore your

laſt

last deuisor 27 is the number by the whith you must abreuiat $\frac{54}{81}$: as in the last example is specified.

¶ An other maner of abbreuiation.

2. Mediate the numerator, and also the Denominator of your Fraction, in case the numbers be euen; that is to saye, take alwayes the halfe of the numerator, and likewyse of the Denominator and of the mediation or halfe of the numerator, make it your numerator, also of halfe ye denominator make your denominator, & so continue as often as you may in taking alwayes the halfe of the numerator, & likewise of ye denominator, or else see if you may abbreuiate the numbers whiche doe remayne, by 3: by 4, by 5, 6, 7, 8, 9: or by 10, for you must abbreuiate them as often as you can by any of the fayde numbers. And it is to be noted, that with what soeuer number of these, you doe abreuiate the numerator of youre fraction, by the same you muste abro-

uiate likewise the denominator, so continuing vntill they canne no more bee abbreuied, and it is to be vnderstoode, that if the numerator, and the denominator be euen numbers, as you maye know when the fyrst fygure of an euen number, or a 0, then may you perceiue if both the Numerator and the Denominator maye be abreuied by 10, by 8 by 6 by 4, or by 2: albeit that sometimes they maye bee abbreuied by 3. And if they be odde numbers, then must you consyder if they may be abreuied by 9, by 7, by 5, or by 3, but when the first number, as well of the numerator, as of the denominator are euen numbers, then maye you well knowe that suche numbers may be abbreuied by 2, as is aforesayde. And if you adde the figures of the numerator together, in such maner as you doe in making the proose by 9 in whole numbers, that is, if you finde 9, it appeareth that you maye abbreuie that number by 9. And likewise by 3, and sometimes by 6, if you finde 6 it may be abbreuied by 6, and

always

alwayes by 3, if you finde 3, it is signe that you abbreuiate by 3. And by what soeuer number that you doe abbreuiate the numerator, by the same must you abbreuiate likewyse the denominator, and if the firste figures of the same nũber be 5, or 0 you may abreuiate them by 5, but if the firste figures be both 0 they may be abreuied 10: in cutting away the 2 ciphers thus, as $\frac{3}{1}|\frac{0}{0}$ whiche maketh $\frac{3}{1}$, & sometimes by 100, thus, as $\frac{1}{2}|\frac{00}{00}$, in cutting awaye the foure ciphers after this sorte, $\frac{1}{1}|\frac{00}{00}$, and then the $\frac{100}{200}$ doe make $\frac{1}{2}$, and after this maner haue I set here diuers examples, although that all broken numbers can not be abbreuied by this rule, yet all fractions may be well abbreuied by the firste rule aforesayd.

Abreuied.

$\frac{3840}{7680}$	by	10	$\frac{1890}{4725}$	by	9
$\frac{384}{768}$	by	8	$\frac{210}{525}$	by	7
$\frac{48}{96}$	by	6	$\frac{30}{75}$	by	5
$\frac{8}{16}$	by	4	$\frac{6}{15}$	by	3
$\frac{2}{4}$	by	2			
$\frac{1}{2}$					

3. Furthermore, you shall vnderstande that sometimes it happeneth, that all the figures of the Numerator are equall vnto them of the denomynator, whiche when it so happeneth, you may then take one of them of the numerator, and also one of them of the denominator, and it shall bee abreuied as $\frac{555}{888}$, being abreuied after this maner commeth to $\frac{5}{8}$. And yet it happeneth sometimes that two, or manye figures of the numerator are proportioned vnto two, or many figures of their denominators, and that the other figures of the same number are the

fygures

one to the other in this proposition following. Then may you take two or more figures, aswel of the numerator as of the denominator, and by this maner the same number shall be abreuied, $\frac{47}{111}$ being abreuied by this rule, doe come to $\frac{4}{11}$.

4. Also it happeneth sometymes that you would abreuiate one number vnto the semblaunce or likenesse of an other. And for to knowe if the same maye bee abreuied, and also by what number it may be abreuied you muste diuide the numerator of the one number, by the numerator of the other, and likewise the Denominator of the one by the denominator of the other, for in case that after euery deuision there doe remayne o, & that the two quotientes be equall, thē is one of them the number by the which the said fraction must be abreuied, as by example of $\frac{115}{207}$. I would know if they maye bee abreuyed vnto $\frac{5}{9}$, and for to doe this, you must diuide 115 by 5, and you must diuide 207 by 9. and there will

come into both the quotientes 23 by the which it appeareth that this number may be abbreuied by 23.

	10		
115/207	115		20
5/9	55	(23	207
			99 (23

The. 4. Chapter treateth of the Adding of two or many broken numbers together, as by example.

FOR to adde Fractions or broken numbers togither, there is a generall rule, which is thus, if the numbers bee of vnlike denomynations the one to the other, you must reduce them into a common denomination by the doctrine of the firste reduction, & when you haue reduced them, you must then adde both the numerators together, and set the producte of the sayd addition ouer the crosse and deuide the same Numerator by the common denominator

natoꝛ, as by the example following.

1. If you will adde $\frac{2}{1}$ with $\frac{1}{4}$, you muſt fyꝛſte reduce the two Fractions both into one denomination accoꝛding to the oꝛder of the fyꝛſte reduction, that is to ſaye in multiplying the denominatoꝛ of the firſte fraction whiche is 3, by the denominatoꝛ of the other fraction whiche is 4. and they make 12 foꝛ your common denominatoꝛ: the which 12 you ſhal ſet vnder ỳ croſſe, then multiply the firſt numeratoꝛ 2 by the laſte denominatoꝛ 4, & therof cõmeth 8 which ſet ouer the $\frac{2}{1}$, and then multiply the laſt numeratoꝛ 3, by the firſt denominatoꝛ 3, and thereof commeth 9, whiche you muſt ſet ouer the $\frac{1}{4}$, then adde the numeratoꝛ 8 with the numeratoꝛ 9, and they make 17, which ſet ouer the croſſe, and then your fraction

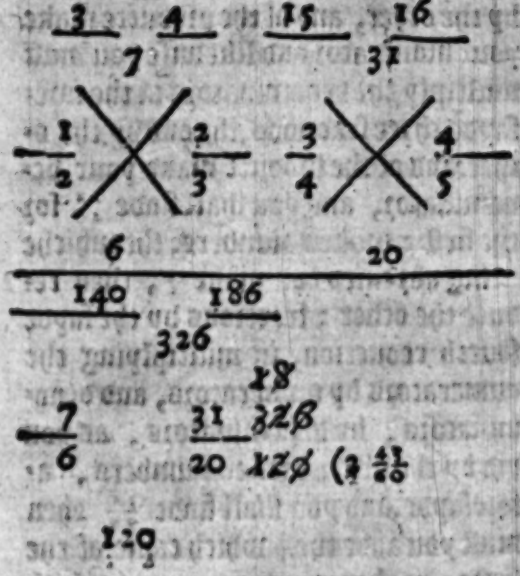
fraction will be $\frac{17}{12}$: which is the addition of the $\frac{2}{1}$ with $\frac{1}{6}$. And because the numerator 17 is greater then the denominator 12, therefore you must diuide 17 by 12, and thereof will come 1, and 5 remayning, whiche 5 you must set apart, and 12 vnder the same, with a line betweene them, & they are worth $\frac{5}{12}$, and so much are the $\frac{2}{1}$ added with $\frac{1}{6}$ as doth appeare.

Addition in broken numbers.

2. Also if you will adde $\frac{1}{2}, \frac{2}{3}, \frac{1}{4}$, and $\frac{4}{7}$ togeather, you must fyrst adde the $\frac{1}{2}$ & $\frac{2}{3}$ together, according to the doctrine of ỹ last rule, and you shall finde $\frac{7}{6}$: then ad $\frac{1}{4}$ and $\frac{4}{7}$ together, by the sayde last rule, and they make $\frac{23}{28}$, then fynallye adde the $\frac{7}{6}$ (which came of the $\frac{1}{2}$ and $\frac{2}{3}$ added togither) with $\frac{23}{28}$, whiche came of the $\frac{1}{4}$ and $\frac{4}{7}$ added togeather, and you shall finde by the foresayde Addition, that they amounte vnto $\frac{326}{120}$. Wherefore diuide 326 by 120, and thereof commeth 2, & 86 remaineth which is $\frac{86}{120}$ of

one

one whole, and they being abreuied, do make $\frac{41}{60}$, and thus the $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ being added togeather doe amount to 2, and $\frac{41}{60}$, as here vnder doth appeare.



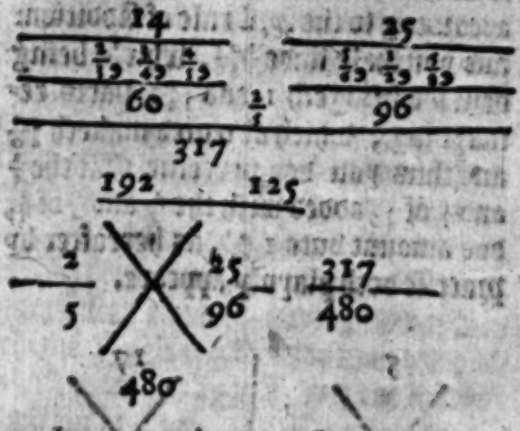
¶ *Addition of broken number of broken.*

3. Furthermore if you will adde the broken numbers of broken together as

as to adde $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{7}$, with the $\frac{4}{5}$ of $\frac{1}{2}$ of $\frac{1}{8}$: firste you must reduce the numbers accordyng to the order of the fourth reduction in multiplying of the numerator of the firste 3 fractions, the one by the other, and of the product make your numerator and likewise you must multiply the denominators of the foresayde three fractions, the one by the other, and of the product make your denominator, and you shall finde $\frac{24}{560}$ for the firste 3 broken numbers, the whiche being abreuied doe make $\frac{1}{7}$, then reduce the other 3 fractions by the sayde fourth reduction, in multiplying the numerators by numerators, and denominators, by denominators, as you did by the firste 3 broken numbers, aforesayde, and you shall finde $\frac{24}{96}$ then must you adde the $\frac{2}{7}$ which came of the firste 3 broken numbers, and $\frac{1}{96}$ which are come of the laste 3 fractions, both togither, by the instruction of the fyrst addition, and you shal fynde $\frac{137}{480}$: which cannot bee abbreuied, but is the iuste product of the addition: so muche are $\frac{2}{7}$

of

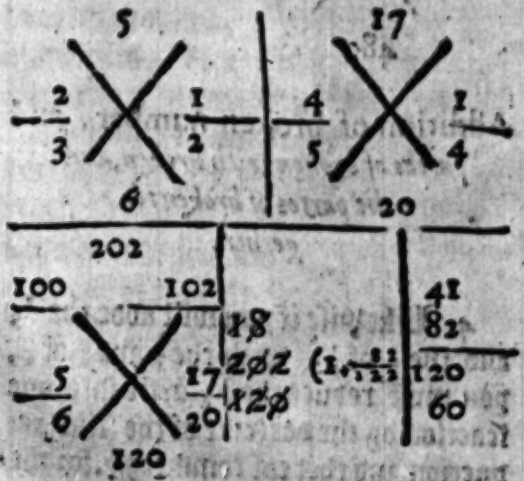
of $\frac{1}{4}$ of $\frac{4}{7}$ added with the $\frac{5}{6}$ of $\frac{3}{5}$ of $\frac{1}{19}$ as hereafter by practise doeth euidentlye appeare.



Addition of broken number, and *partes of broken with broken, and the partes of broken together.*

4. Likewise if you will adde the $\frac{2}{19}$ and the $\frac{1}{2}$ of $\frac{1}{19}$ with the $\frac{3}{7}$ and $\frac{1}{4}$ of $\frac{1}{49}$ you must reduce the $\frac{2}{19}$ $\frac{1}{2}$ firste into one fraction by the doctrine of the like reduction, and ther eof commeth $\frac{1}{6}$. for the $\frac{2}{5}$ and

$\frac{2}{3}$ and $\frac{1}{2}$ of one of the sayd thyrdes, then reduce the $\frac{4}{5}$ and $\frac{1}{4}$ by the sayde fifte reduction, and thereof commeth $\frac{17}{20}$. Last of all adde the $\frac{1}{6}$ and $\frac{17}{20}$ togeather accoyding to the fyrst rule of Addition: and you shall finde $\frac{202}{120}$, whiche being deuided byngeth 1, and $\frac{82}{120}$ parts remayning, which abreuied maketh $\frac{41}{60}$ and thus you doe perceiue that the $\frac{2}{3}$ and $\frac{1}{2}$ of $\frac{1}{3}$, added with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{3}$, doe amount vnto $1\frac{41}{60}$, as hereafter by practise doth playnly appeare.



Addition

Addition of whole number and broken, *with whole number and broken.*

5 Also if you will adde 12 4/7 with 20 1/6, you may (you may if you will) adde 12 and 20 together, and they make 32 the which you shall sette aparte, and then adde the two broken numbers togeather, that is to say 4/7 and 1/6 by the order of the first addition, & they make 31/42, therefore diuide 49 by 30, and thereof commeth 1 and 19/30 partes remayne whiche 1 you muste adde vnto the 32 which were put aparte, and the whole addition will be 33 19/30. Or otherwyse, you may reduce 12 4/7 into the likenesse of a Fraction by the order of the firte reduction, and they will be 88/7, and likewise by the same reduction, reduce 20 1/6, and they be 121/6, then adde 88/7 wyth the 121/6 by the firste addition, and you shall fynde 1009/30. Therefore diuyde 1009 by 30, and thereof commeth 33 19/30 as before, and as by practise of the same both wayes doeth hereafter appeare

peare.

The fift Chapter treateth of Substraction in broken numbers.

1 IF you will substract ⅓ frō ½ you must first reduce both the fractions into a common denomination, by the doctrine of the first reduction, and you

you shall finde $\frac{1}{12}$ for the $\frac{2}{3}$, and $\frac{3}{12}$ for the $\frac{1}{4}$. Therfore, abate the numerator 8 frō the numerator 9, and there will remayne 1, whiche you must set ouer the crosse, and the same is $\frac{1}{12}$, and so muche is the rest of that subtraction, as may appeare here by practise.

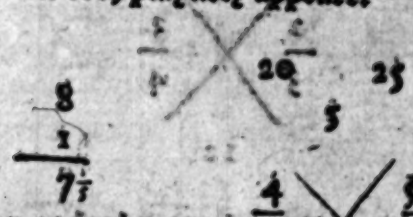
$$\frac{8}{3} \quad \frac{9}{4}$$

$$\frac{2}{3} \quad \frac{3}{4}$$

12

But if you haue a broken number to be subtracted frō a whole number, you muste borrowe 1 vnitie of the whole number, and resolue it into a fraction of like denomination, as is that fraction whiche you would abate from the same whole number, and then abate the sayd fraction therefrom & you shall finde what doth remayne, as by this example. If you abate $\frac{2}{3}$ frō

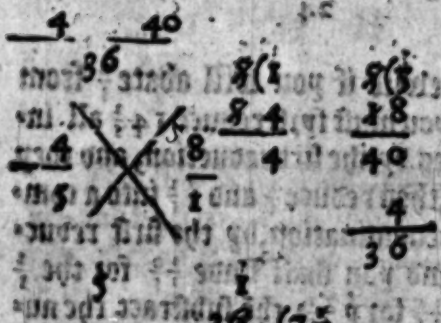
8, you muſt borrowe one of the ſayd 8, & reſolue it vnto fifts like vnto the fraction, becauſe it is $\frac{2}{5}$, and that 1 will be 5 fiftes thus $\frac{5}{5}$, therefore abate $\frac{2}{5}$ from $\frac{5}{5}$, and there will remayne $\frac{3}{5}$, and ſubtract the 1 which you borrowed from 8, and there doth remayne 7, and the $\frac{3}{5}$ alſo which remayned after the ſayde $\frac{2}{5}$ were abated. Thus the $\frac{2}{5}$ being ſubſtracted from 8, doth leaue $7\frac{3}{5}$, as by practiſe doth playnely appeare.



Or otherwiſe you ſhall put vnder 8, with a lyne betwene, and that will be $\frac{8}{1}$: then ſet down the $\frac{2}{5}$ and the $\frac{5}{5}$ with a croſſe betweene them, then you muſt reduce them into one denomination by the firſt reduction, and you ſhall finde 4 ouer the $\frac{2}{5}$, and 40 ouer the $\frac{5}{5}$,

then

then subtract the sayd 4 from 40, and there will remayne 36, the which you shall sette ouer the crosse, and they doe make $\frac{36}{5}$. Likewise you muste multiplye the Denominator 5 by 1, maketh 5, set that vnder the crosse, then diuide 36 by 5, and thereof will come $7\frac{1}{5}$ as before for the rest of that subtraction, as here by practise appeareth.



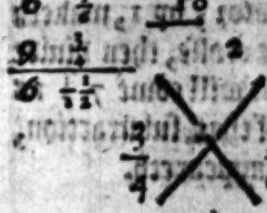
3. If you will subtract broken nomber from whole number and broken: as if you would subtract $\frac{1}{4}$ from $6\frac{1}{2}$, you may by the first subtraction abate $\frac{1}{4}$ from $\frac{1}{2}$, and there will remayne $\frac{1}{2\,4}$ & the 6 doth still remaine whole, because the $\frac{1}{4}$ may well be abated from the $\frac{1}{2}$

and thus $\frac{3}{4}$ beeing abated from 6 $\frac{5}{6}$ leaueth 6 $\frac{1}{12}$, as appeareth by practise.

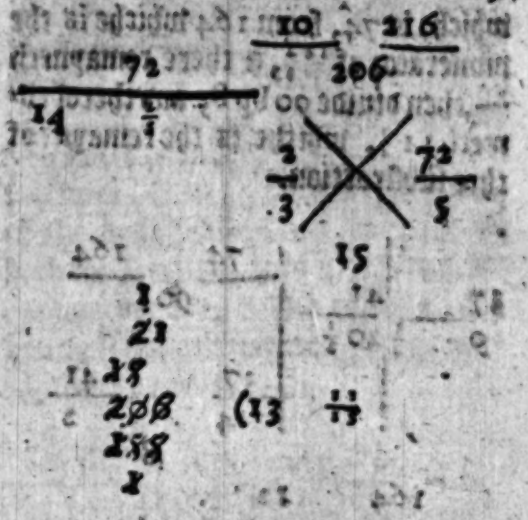
$$\begin{array}{ccc} 6 & \frac{5}{6} & \underline{18} \quad \underline{20} \\ \underline{9} & \underline{\frac{3}{4}} & 2 \\ 6 & \frac{1}{12} & \end{array}$$

$$\frac{3}{4} \qquad \frac{5}{6} \qquad \frac{1}{12}$$

24

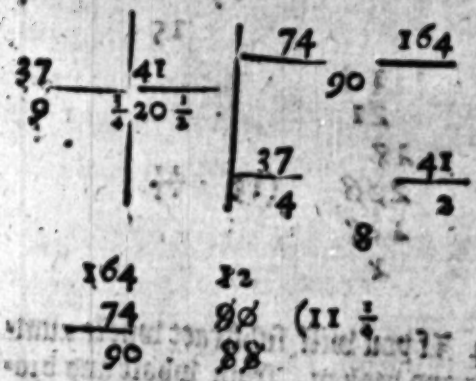


Likewise if you will abate $\frac{2}{3}$ from 14 $\frac{2}{5}$, you must fyrst reduce 14 $\frac{2}{5}$ all into fiftes by the first reduction, and they be $\frac{72}{5}$, then reduce $\frac{2}{3}$ and $\frac{72}{5}$ into a common denomination, by the first reduction, and you shall finde $\frac{10}{15}$ for the $\frac{2}{3}$ and $\frac{216}{15}$ for ye $\frac{72}{5}$: thē substract the numerator 10 of the first fraction, from 216 of the second fraction, & there remayneth $\frac{206}{15}$. Therefore diuide 206, by 15, and thereof commeth 13 $\frac{11}{15}$, and so much remaynes of this subtraction as may appeare in the nexte page following.



4 If you will subtract whole number and broken, from whole and broken, as thus, if you will subtract $9\frac{1}{4}$ from $20\frac{1}{2}$ you must reduce $9\frac{1}{4}$ into fourthes, and likewise the $20\frac{1}{2}$ into halfes by the first reduction, and you shall finde $\frac{37}{4}$ for the $9\frac{1}{4}$: and $\frac{41}{2}$ for the $20\frac{1}{2}$: Then reduce $\frac{37}{4}$, and $\frac{41}{2}$ into one Denomination: according unto the firste reduction, and you shall finde $\frac{74}{8}$ for the $\frac{37}{4}$, and $\frac{82}{8}$ for the $\frac{41}{2}$, then abate the numerator of $\frac{74}{8}$

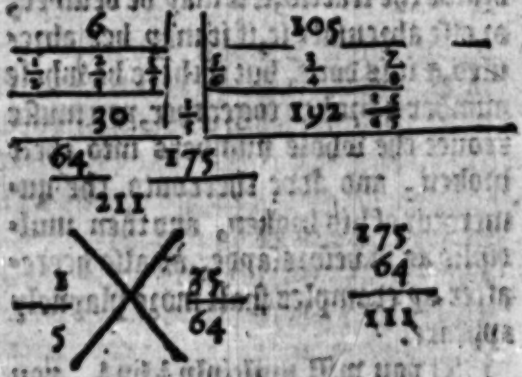
whiche is 74, from 164 whiche is the numerator of $\frac{164}{1}$, & there remayneth $\frac{90}{1}$, then diuide 90 by 8, and therof cõmeth $11\frac{2}{4}$, whiche is the remayne of this subtraction.



Subtraction of broken numbers of broken from fractions of fractions.

5 If you will subtract the $\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{3}{5}$, from the $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{7}{8}$, you must fyrste bring the $\frac{1}{2}$ of $\frac{3}{1}$ of $\frac{1}{5}$ into one fraction, by the 3 reuuction: and the $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{7}{8}$, likewise into one fraction by the same reuuction, and you shall fynde $\frac{6}{30}$ for the

the first 3 broken numbers, whiche being abbreuied doe make $\frac{1}{7}$: and for the other 3 broken numbers, you shall finde $\frac{10}{192}$: whiche beeinge likewyse abbreuied do make $\frac{5}{96}$, then you shall substract $\frac{1}{7}$ from $\frac{5}{96}$ by the instruction of the firste substraction in reducing both the fractions into a common denomination, as before is done, and you shall finde remayning $\frac{11}{1120}$, as may appeare by example.

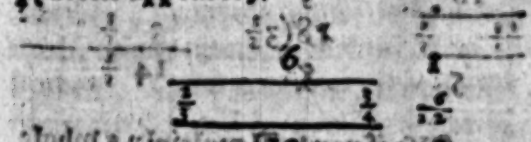


The sixt chapter is of multiplication in broken numbers.

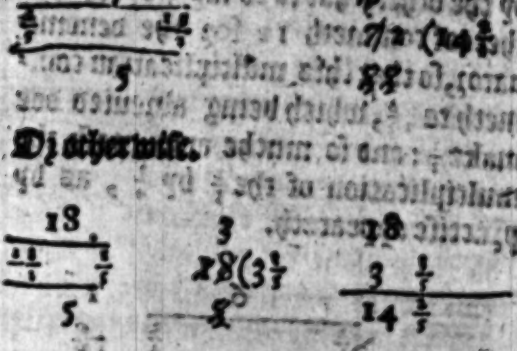
FIrst for to multiply in broken number there is a rule which is thus, you muste multiply the numerator of the one fraction, by the numerator of the other, and likewise you must multiplie the denominator of y one by the denominator of the other. And then diuide the fractiō, if it may be deuided, or else abreuiate it, if it may bee abreuied, & it is done, but if there be whole number & broken togeather, you muste reduce the whole numbers into their broken, and adde thereunto the numerator of his broken, and then multiplie as is beforesayde, as also hereafter by examples shall more playnely appeare.

1 If you will multiply $\frac{2}{3}$ by $\frac{1}{2}$, you must multiply the numerator 2 by the numerator 3, and thereof commeth 6: for the numerator. Likewise you must multiply the denominators the one by

by the other, that is to say 3 by 4, and thereof commeth 12 for the denominator, so that this multiplication commeth to $\frac{6}{12}$, which being abreuied doe make $\frac{1}{2}$: and so muche amounteth the multiplication of the $\frac{3}{4}$ by $\frac{1}{4}$, as by practise appeareth.



4. Likewise if you will multiply a broken number by whole number, or whole number by broken which is all one, as $\frac{4}{5}$ by 18, or else 18 by $\frac{4}{5}$, you must set 1 vnder 18, thus $\frac{18}{1}$: & then multiply y numerator 18 by the numerator 4, and thereof commeth 72. Likewyse multiply the denominator 5 by the denominator 1, and thereof commeth 5, then deuide 72 by the denominator 5, and thereof cõmeth $14\frac{2}{5}$, for the whole multiplication. Or otherwise, abate frõ 18 his $\frac{1}{5}$ part, which is $3\frac{3}{5}$, & there remayneth $14\frac{2}{5}$, as hereafter followeth

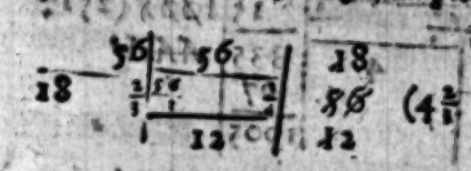


Or otherwise.

3. Also if you will multiply a whole number, by whole number & broken, or else whole number and broken by a whole number which is all one, as by example: if you will multiply 15 by $16\frac{1}{4}$, or else $16\frac{1}{4}$ by 15: First reduce $16\frac{1}{4}$ all into fourthes, in multiplying 16 be the denominator of $\frac{1}{4}$, which is 4 and thereof commeth 64, whereunto adde the numerator 3, and it maketh $\frac{67}{4}$: which multiply by $\frac{15}{1}$, according to the instruction of the last example, and you shall finde the produete of this multiplication to be $251\frac{1}{4}$, as by practise in the next page following doeth appeare.

4. And if you wil multiply a broken number, by whole number & broken, or else whole number and broken by a broken. As by example, if you will multiply $\frac{1}{4}$ by $18\frac{1}{3}$, or else $18\frac{1}{4}$ by $\frac{1}{3}$, which is all one, you muste reduce the whole number into his broken by the first reduction, and you shall fynde $\frac{54}{3}$, which you shall multiplye by the $\frac{1}{4}$ after the doctrine of the fyrst multiplication, that is to saye, in multiplyinge the Numerator 56, by the Numerator of $\frac{1}{4}$, which is 1: and it is still 56, because 1 doeth neither multiplye nor diuide, and likewyse you muste multiply the denominator 3, by the Denominator 4, and it maketh 12: then deuide 56 by 12, and thereof commeth $4\frac{8}{12}$. And so much amounteth the multiplication of the saye $18\frac{1}{3}$ mul-

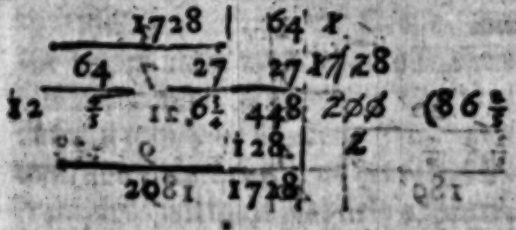
$\frac{2}{3}$ multiplyed by $\frac{1}{2}$, as by example.



5. If you will multiply whole nũber and broken, with whole and broken, you must firste put eyther whole number into his broken according to the instruction of the firte reduction, and then multiplye the one numerator by the other, and of the producte make your numerator. And likewise multiplie the denominators the one by the other, and thereof make the denominator, then deuide the numerator by the denominator, and the quotiente shall be the increase of this multiplication. Example. If you would multiplye $12\frac{2}{3}$ by $6\frac{1}{2}$: first by the firt reduction that $12\frac{2}{3}$ will make $\frac{38}{3}$: and the $6\frac{1}{2}$ wyll make $\frac{27}{4}$, then multiply the numerator 64, by the numerator 27, and thereof commeth 1728 for the numerator, and then you must multiplie the denomina-

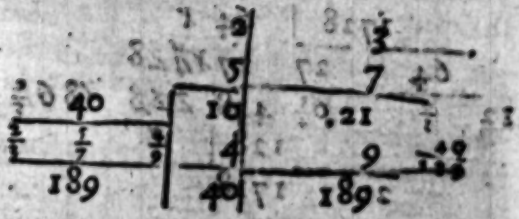
tor

nator 5, by the denominator 4, & they do make 20: then diuide 1728 by 20, and thereof commeth 86, for the whole multiplication as by example.



6. If you will multiplie one broken number by manye broken numbers, thus: As to multiplie 2/3 by 1/7, and by 4/5, you must multiplie the numerators of all the fractions the one by the other, and of the product make the numerator, that is to say, 2 by 5, and they be 10, then 10 by 4, and they be 40 for the Numerator. Likewyse you must multiplie the denominators the one by the other, that is to say, 3 by 7 maketh 21, then 21 by 9 maketh 189, for the denominator: then set 40 ouer 189 with a line betweene them, and they make 40/189. And so muche amounteth

the whole multiplication of the $\frac{2}{5}$ multiplyed by $\frac{1}{7}$ and $\frac{2}{3}$ as by example following. And thus is to be vnderstoode of all such like.



The 7. Chapter treateth of Diuision in broken numbers.

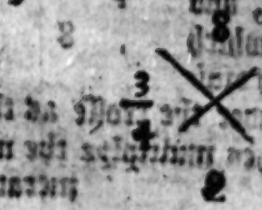
NOTE that in Diuision of broken numbers you muste sette your Diuisor downe right, nexte vnto the lefte hande, and the Diuidende or number which is to be diuided alwayes toward the righte hande. And then multiplye crosselwise, that is to say the numerator of your diuisor, by the denominator of the diuidende: and the product shall bee the denominator which afterwarde shall bee your Diuisor.

Any

And likewise you muſt multiplye the Denominator of your firſte number, that is to ſay of your deuiſor, by the Numerator of the Diuidende, whiche afterward ſhall be the diuidende, and that muſt bee ſet ouer the Croſſe, and the denominator vnder the croſſe, then diuide the numerator by the denominator, if it may be diuided, if not, you muſt abbreuiate them, as hereafter by examples ſhall more playnely appeare.

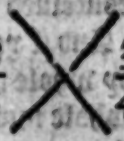
1. If you will diuide $\frac{1}{2}$ by $\frac{3}{4}$, you muſt ſet the diuiſor (which is $\frac{3}{4}$) nerre to the lefte hande, and the diuidende $\frac{1}{2}$ toward your right hande with a croſſe betweene them: as maye appeare by this example in ye margent. Then you ſhall multiplie the numerator of the $\frac{1}{2}$, which is 2 by the denominator of the $\frac{3}{4}$ which is 4, and therof cõmeth 8 which ſhal be your new diuiſor, ſet that 8 vnder the croſſe as the denominator: then multiplye the numerator

merator of the diuidende, that is to say of the $\frac{1}{2}$ whiche is 3 by the denominator of the deuisor, that is to wit, of the $\frac{2}{3}$ which is 3, and thereof commeth 9, set the 9 ouer the crosse of the numerator, which shall be now the diuidend or number to be deuided. Then finally you shall diuide 9 by 8, and thereof commeth into the quotient $1\frac{1}{8}$, and so often times is $\frac{2}{3}$ conteyned in $\frac{1}{2}$ as doth appeare before in the margent. But in case you would diuide $\frac{1}{2}$ by $\frac{1}{2}$, you must likewise serue your deuisor $\frac{1}{2}$ nexte to your left hand, as is before sayde. And then proceede as is aboue declared, & you shall find that $\frac{1}{2}$ deuided by $\frac{1}{2}$ bringeth into the quotient $\frac{1}{2}$, whiche cannot be deuided nor abreuied. Wherefore it appeareth that $\frac{1}{2}$ being diuided by $\frac{1}{2}$ bringeth but $\frac{1}{2}$ of one vnite into the quotient as doth appeare.



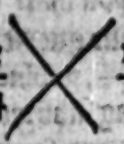
2. Likewise if you will diuide a broken number by a whole number, or else a whole number by a broken, as to diuide $\frac{3}{4}$ by 13, you shall put 1 vnder 3, and it will be $\frac{13}{1}$ for your diuisor, set ẏ towardde your lefte hande, and then multiplye 13 by 4, according to the first diuision, and thereof will come 52, for the denominator, set that vnder the crosse, and multiply 3 by 1, maketh 3 for the numerator, sette that ouer the crosse, and it is $\frac{3}{52}$, as appeareth in the margine.

$$\begin{array}{ccc} & 3 & \\ \frac{13}{1} & \times & \frac{3}{4} \\ & 52 & \end{array}$$



But if you will diuide 13 by $\frac{3}{4}$, then set the $\frac{3}{4}$ next your left hande, and put one vnder 13, as in the last example, & it is $\frac{13}{1}$, set ẏ toward youre righte hande thus, as appeareth in the margine, and then worke according to the doctrine of the first diuisiō, &

$$\begin{array}{ccc} & 52 & \\ \frac{3}{4} & \times & \frac{13}{1} \\ & 3 & \end{array}$$



you shall finde that 13 beeing deuyded by $\frac{3}{4}$ bringeth into ẏ quotient $\frac{52}{3}$, then diuyde 52 by 3, and thereof commeth 17 $\frac{1}{3}$, and so oftentimes is $\frac{3}{4}$ conteined in 13, as doeth appeare.

21
52
33 (17 $\frac{1}{3}$

3. And if you will diuide whole nũber by whole number and broken, or else whole number and brokẽ by whole number, as to diuide 20 by 5 $\frac{5}{6}$, you shall reduce 5 $\frac{5}{6}$ into broken by the sixte reduction, and it maketh $\frac{35}{6}$ for your diuisor, then put 1 vnder 20, and it wil be $\frac{20}{1}$, then shal you multiplye 35 by 1, and 20 by 6, as is taught in the other diuisions, and you shal finde $\frac{120}{35}$: then diuide 120 by 35: and you shall finde in your quotient 3 and $\frac{15}{35}$, ẏ which $\frac{15}{35}$ beeing abbreuied, is $\frac{3}{7}$, and so manye tymes 5 $\frac{5}{6}$ contey-

120

$\frac{35}{6}$ $\frac{20}{1}$

35

1
35
120 (3 $\frac{5}{7}$
35

nes

ned in 20 as in ẏ margine appeareth.

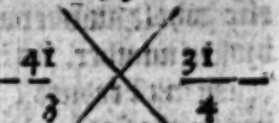
But if you will diuyde 5 $\frac{5}{6}$ by 20, you shall haue $\frac{35}{120}$, then you must diuide 35 by 120, which you cannot dyuide, wherefore you shall abbreuiate $\frac{35}{120}$, and thereof commeth $\frac{7}{24}$ for youre quotient.

4. If you will diuide a broken number, by whole number and broken, or else whole number and broken, by a broken number. As to diuide $\frac{3}{4}$ by 13, $\frac{2}{3}$, you must reduce 13 $\frac{2}{3}$, into his broken by the sixt reduction and they bee $\frac{41}{3}$ for your diuisor, then multiply 41 by 4, & they make 164 for your denominator, likewise multiply 3 by 3

and they make 9 for the numerator, & then will your summe bee $\frac{9}{164}$ as appeareth in the worke afore noted. But if you will diuide 13 $\frac{2}{3}$ by $\frac{3}{4}$, then you must diuide 164 by 9, and you shall

finde 18 $\frac{3}{5}$.

5. If you will diuide whole number and broken by whole number and broken, as to diuide 7 $\frac{1}{4}$ by 13 $\frac{2}{3}$ you muste reduce to whole numbers into their broken, by the doctrine of the firt reduction, and you shall finde $\frac{41}{4}$ for the 7 $\frac{1}{4}$ and $\frac{31}{3}$ for the 13 $\frac{2}{3}$: Then set downe $\frac{41}{4}$ toward ỳ left hande, bycause it is your diuisor, and the $\frac{31}{3}$ towarde the right hande, & multiply 41 by 4 for youre denominator: and thereof commeth 164. Likewise multiply 31 by 3, for your Numerator, & it amounteth to 93, the whiche diuision will bee thus $\frac{93}{164}$, as before doeth appeare.



But if you will diuide 13 $\frac{2}{3}$ by 7 $\frac{1}{4}$. you muste (contrariwyse to the other example) diuide 164 by 93: and you shall finde in the quotient 1 $\frac{71}{93}$.

6. The broken numbers of broken, must

must be deuided in such maner as broken numbers are, and there is no difference, sauing onlye that of diuerse & manye broken numbers, you muste make but two broken numbers, that is to say, the one for the diuisor, and the other for the diuidend or number that is to be deuided, example. If you wil diuide the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$, by the $\frac{2}{3}$ of $\frac{4}{7}$, you must vnderstand that for the fyrst, the $\frac{3}{4}$ of $\frac{3}{5}$ of $\frac{1}{2}$ are $\frac{9}{40}$ by ẏ third redudtion and the $\frac{2}{3}$ of $\frac{4}{7}$ are by the same reduction $\frac{8}{21}$ thē haue you $\frac{8}{21}$ for your deuisor & $\frac{9}{40}$ for your number to be diuided, then multiplye 8 by 40, which maketh 320, set that vnder ẏ crosse and multiply 9 by 21 and thereof commeth 189: whiche set ouer the crosse for the numerator, and they make $\frac{189}{320}$ for this diuision, as doth appeare.

$$\begin{array}{ccc} & 189 & \\ \frac{8}{21} & \times & \frac{9}{40} \\ & 320 & \end{array}$$

But if you would deuide $\frac{8}{21}$ by $\frac{9}{40}$ you must worke contrarye to the laste

example, ỳ is to say, you muste dyuyde 220, by 189, ỳ therof commeth in the quotient $1\frac{1}{21}$.

The eyght Chapter treateth of Duplation, triplation, and quadruplation of all broken numbers.

IF you will double anye broken number you shall diuide ỳ same by $\frac{1}{2}$ lykewise if you will triple any fraction, you must diuide it by $\frac{1}{3}$. And for to quadruple anye broken number, you shall diuide it by $\frac{1}{4}$, and so is to bee vnderstoode of all other.

Example of Duplation.

IF you will double $\frac{3}{8}$ you shall diuide $\frac{3}{8}$ by $\frac{1}{2}$, and therof commeth $\frac{6}{8}$, whiche beeing abbreuied are $\frac{3}{4}$ as by example.

$$\frac{3}{8} \times \frac{1}{2} = \frac{3}{8} \times \frac{2}{1} = \frac{6}{8} = \frac{3}{4}$$

Or otherwise, in case the denominator of any fraction be an euen

euen number, you may take halfe the sayd denominator, without anye other operation, and the numerator to abide still the numerator vnto the sayde half of the denominator of the Fraction, as by the other example before rehearsed that is to say of $\frac{1}{8}$, take $\frac{1}{4}$ of 8 which is 4, and that is the denominator, and 3 remayneth still numerator to 4, and it maketh $\frac{3}{4}$, and so of all other. But in case the denominator bee an odde number, that is to say, not euen, then you may multiply the numerator by 2, or else double the numerator, which is al one thing, and the fraction shall bee doubled. Example, if you will double $\frac{3}{5}$ you must onlye multiply the Numerator 3, by 2, and they be 6: which maketh the fraction to be $\frac{6}{5}$, the whiche 6 being deuided by 5 bringeth $1\frac{1}{5}$ and so much is the double of $\frac{3}{5}$.

Example of Triplation.

If you will triple $\frac{1}{5}$ you must diuide $\frac{3}{5}$ by $\frac{1}{12}$ and therof commeth $\frac{2}{5}$, whiche

beeing diuyded, bringeth 1 $\frac{2}{3}$, or other wise 3, because the denominator is an odde number, you may multiplye the numerator 3, by 3, and thereof cometh 9, which maketh $\frac{9}{3}$, as before apeared.

Examples of quadruplation.

If you will quadruple $\frac{4}{7}$, you shall diuide $\frac{4}{7}$ by $\frac{1}{4}$, and thereof commeth $\frac{16}{7}$, which 16 being deuided by 5, bringeth 3 $\frac{1}{7}$, or otherwise, because the denominator of the fraction in an odde number you shall multiplye the numerator of the $\frac{4}{7}$, that is to say, 4 by 4, and thereof commeth 16, the whiche diuide by 5, and you shall finde 4 $\frac{1}{7}$ as before. And this sufficeth for duplation, triplation, and quadruplation.

The 9 Chapter treteth of the proues of broken numbers. And first of Reduction.

If you doe abbreuiate the broken numbers which be reduced, you shal returne

returne them into the first estate: as by example, if you reduce $\frac{3}{4}$ with $\frac{4}{5}$ you shall finde $\frac{15}{20}$ and $\frac{16}{20}$, then abbreuiate $\frac{15}{20}$, and you shall synde $\frac{3}{4}$, abbreuiate likewyse $\frac{16}{20}$, and thereof commeth $\frac{4}{5}$, as before.

The proofe of Abbreuiation.

IF you doe multiplye that number which you haue abbreuyed, by that or those numbers by the whiche you haue abreuied them, you shall returne them agayne into their fyrste estate. Example, if you wyl abreuyate $\frac{12}{16}$ by 16, in taking the $\frac{1}{16}$ parte both of the numerator, and also of the denominator, you shall finde $\frac{3}{4}$, the proofe is thus you muste multiplye both the numerator & denominator of $\frac{3}{4}$, that is to say, 3 by 16, maketh 48, for the denominator, & 2 by 16, maketh 32 for the Numerator: then set the Numerator 32, ouer the denominator 48, and they be $\frac{32}{48}$ as before.

If

If you doe ſubtract one of the numbers, or manye of them (whiche you haue added) from the totall ſumme, there ſhall remayne the other or others Example: if you do adde $\frac{1}{4}$ with $\frac{1}{4}$ you ſhall finde $\frac{2}{4}$. The proofe is, if you ſubtract $\frac{1}{4}$ from $\frac{2}{4}$, you ſhall fynd remayning the other number whiche is $\frac{1}{4}$ or elſe if you doe ſubtract $\frac{1}{4}$ from $\frac{2}{4}$ there will remayne the other number which is $\frac{1}{4}$.

The proofe of ſubtraction.

If you doe adde that number which remayneth, with the number whiche you did ſubtracte, you ſhall finde the totall ſumme, oute of the whiche you made the abatement, or otherwiſe, if you adde the two leſſer numbers togeather, you ſhall fynde the greater Example: if you doe ſubtracte $\frac{1}{4}$ from $\frac{2}{4}$, there will remayne $\frac{1}{4}$. The proofe is thus: you muſt adde $\frac{1}{4}$ and $\frac{1}{4}$ togeather, and you ſhall fynde $\frac{2}{4}$, the which beeing abbreuied doth make $\frac{1}{2}$, which

is

is the greatest number.

The proofe of Multiplication.

If you diuide the producte of the whole multiplication, by the multiplycator, you shall fynde in your quotient the multiplicand, or number þ whiche you haue multiplied, or else if you diuide the totall summe which is come of the multiplication by the multiplycand: you shall fynde in the quotiente the multiplicator, example, if you multiply $\frac{2}{3}$ by $\frac{4}{7}$, the producte of this multiplication will be $\frac{8}{21}$. The proofe is thus: you shall diuide $\frac{8}{21}$ by the multiplicator $\frac{4}{7}$, and thereof commeth $\frac{2}{3}$, whiche is the multiplicand, or else diuide $\frac{8}{21}$ by $\frac{2}{3}$ and you shall fynde the $\frac{4}{7}$ which is the multiplicator.

The proofe of Diuision.

If you doe multiply the quotient by the diuisor, you shall finde the number which you did diuide, that is to saye,

your

your diuidend, Example, if you diuide $\frac{2}{1}$ by $\frac{1}{4}$, your quotient wil be $\frac{8}{1}$, the proofe is thus, you must multiplye $\frac{8}{1}$ by $\frac{1}{4}$, and thereof commeth —— whiche being abbreuied are $\frac{2}{1}$, which is your diuidend, and by this manner all whole numbers haue their proofes as wel as broken numbers.

The tenth Chapter treateth of certaine questions done by broken numbers, and first by reduction.

FInde two numbers, whereof the $\frac{2}{7}$ of the one number maye bee equall vnto the $\frac{3}{4}$ of ỹ other. *Answere.* You shall reduce $\frac{2}{7}$ and $\frac{3}{4}$ crosselwyse, and you shall finde 16, ouer the $\frac{2}{7}$, and 21 ouer the $\frac{3}{4}$, whiche are the two numbers that you seeke, for the $\frac{2}{7}$ of 16 are 6, and so are the $\frac{3}{4}$ of 21, likewise 6 wherefore you maye perceiue that the $\frac{2}{7}$ of 16 which are 6, are equal vnto the $\frac{3}{4}$ of 21, which is also 6.

2. Finde two numbers, whereof the

$\frac{3}{4}$ of

$\frac{2}{3}$ of the one may bee double to the $\frac{1}{4}$ of the other. *Answere.* double $\frac{1}{4}$, and you shall haue $\frac{2}{4}$, whiche being abbreuyed is $\frac{1}{2}$, then reduce $\frac{1}{1}$ and $\frac{1}{2}$ crossewise, & you shall finde 4 ouer the $\frac{2}{1}$, and 3 ouer the $\frac{1}{1}$, which are the two numbers that you seeke. For the $\frac{1}{1}$ of 3, which is 2, is double vnto the $\frac{1}{2}$ of 4 which is but 1.

3. Finde two numbers, whereof the $\frac{1}{1}$ and the $\frac{1}{4}$ of the one, maye bee equall vnto the $\frac{1}{4}$ & $\frac{1}{7}$ of the other. *Answere.* Adde the $\frac{1}{1}$ and $\frac{1}{4}$ togeather, and they make $\frac{5}{12}$, then adde $\frac{1}{4}$ and $\frac{1}{7}$ together, & they are $\frac{10}{140}$: then reduce $\frac{7}{12}$ and $\frac{5}{20}$ crossewyse, and you shall haue 140, ouer the $\frac{7}{10}$, and 108 ouer the $\frac{9}{10}$, which are the two numbers that you seeke. For 63 which are the $\frac{7}{12}$ of 108, are also the $\frac{9}{10}$ of 140.

4. Finde two numbers, whereof the $\frac{2}{3}$ the $\frac{1}{7}$ and the $\frac{1}{4}$ of the one of them, may be equall vnto the $\frac{1}{7}$ the $\frac{1}{7}$ and $\frac{3}{7}$ of the other number. *Answere*, firste you must adde $\frac{2}{12}$, $\frac{1}{12}$, and $\frac{1}{4}$ togeather & they make $\frac{11}{12}$: then adde $\frac{1}{132}$ and $\frac{1}{7}$ to-

gether

gether, and they make $\frac{107}{210}$. Then reduce $\frac{1}{2}\frac{1}{1}$ and $\frac{107}{210}$ crosselwise, as by the firste questian of reduction, and you shall finde 2730 ouer the $\frac{11}{21}$, & 1284 ouer the $\frac{107}{210}$, which are the two numbers that you seeke: for 1391 whiche is the $\frac{1}{3}$ the $\frac{1}{7}$ the $\frac{1}{2}$ of 1284: is lyke to the $\frac{1}{7}$, $\frac{1}{5}$ and $\frac{1}{7}$ of 2730, whiche is also 1391.

1. Finde three numbers, whereof the $\frac{2}{1}$ of the firste, the $\frac{1}{7}$ of the seconde, & the $\frac{4}{5}$ of the thirde may be equall, the one to the other: *Answere*, set downe the $\frac{2}{1}$, $\frac{1}{7}$ and $\frac{1}{4}$, and then multiply the Denominator of the $\frac{2}{1}$, that is to say 5 by the numerators of the other two Fractions, that is to saye, by the numerator of $\frac{1}{7}$, and by the numerator of $\frac{4}{5}$, which is 3 and 4, and thereof commeth 60 for your fyrste number: then shall you multiplye the denominator of the $\frac{1}{7}$ whiche is 7, by the numerators of $\frac{2}{1}$ and $\frac{4}{5}$, that is to saye by 2 and 4, and thereof commeth 56, for the seconde number. Then multiplye the denominator of $\frac{4}{5}$, that is to say, 9

by

by the numerator of $\frac{2}{3}$ and $\frac{1}{7}$, that is by 2 and by 3, and thereof commeth 54 for the thirde number, and thus the $\frac{2}{3}$ of 60, whiche is 24, is likewise the $\frac{1}{7}$ of 56, which is the seconde number and is also the $\frac{4}{9}$ of 54, whiche is the thirde number.

6. Finde three numbers, of whiche the firste and the second may be in such proporcion as $\frac{1}{2}$, & $\frac{1}{3}$, and the second and thirde in suche proporcion as $\frac{1}{4}$ and $\frac{1}{7}$.

Answere. Reduce $\frac{1}{2}$ and $\frac{1}{3}$ crosselwyse, and you shall haue 3 ouer the $\frac{1}{2}$, and 2 ouer the $\frac{1}{3}$, then reduce $\frac{1}{4}$ and $\frac{1}{7}$ in lyke maner, and you shall finde 7 ouer the $\frac{1}{4}$, and 4 ouer the $\frac{1}{7}$. Then saye by the Rule of three, if 7 do giue me 4, what shall 2 geue me, whiche is the seconde proporcionall, multiplye the seconde number 4, by the thyrd number 2, and thereof commeth 8, the whiche deuide by the fyrst number 7, and thereof commeth $1\frac{1}{7}$ for the thirde proporcionall: and you shall finde that 3, 2, $1\frac{1}{7}$, are the three numbers proporcionall that I demaund, or else 15, 10, and $8\frac{4}{7}$, in

in whole numbers.

¶ Questions done by addition in fractions.

WHAT number is that, vnto the whiche if you adde 13, the whole amounteth to 31? *Answere.* Subtract 13 from 31, and ther wil remaine 18, which is ỳ nũber ỳ you seke.

2. What number is that, vnto the whiche if you adde $\frac{2}{7}$, the addition will be $\frac{1}{6}$? *Aunswere.* Abate $\frac{2}{7}$ from $\frac{1}{6}$, and there will remayne $\frac{11}{10}$, whiche is the number that you desyre.

3. What number is that whervnto if you add $7\frac{2}{3}$, the whole Addition wil be $12\frac{1}{4}$? *Aunswere.* Abate $7\frac{2}{3}$ from $12\frac{1}{4}$, and the remayne will bee $4\frac{7}{12}$, which is the number that you desyre to know.

4. What number is that wherevnto if you adde the $\frac{1}{4}$ of it selfe, that is to saye, of the number that you seeke, the whole addition maye be $\frac{1}{6}$? *Aunswere,* Here followeth a generall rule

for

for all such like questions. Firste of 3, which is the numerator of $\frac{3}{4}$ make that still the numerator: and likewise of 3 and 4 added together, which is both y numerator and the denomynator: of the $\frac{3}{4}$, make them your denominator: so you shall finde $\frac{3}{7}$: then take the $\frac{3}{7}$ of $\frac{15}{6}$, which is $\frac{15}{42}$ or $\frac{5}{14}$, and subtracte them from $\frac{5}{6}$, & there will remayne $\frac{10}{21}$ which is the number that you seeke.

5. What number is that, unto the which if you adde his owne $\frac{2}{3}$, that is to say $\frac{2}{3}$ of it selfe, the whole addition shall be 20? *Aunswere*, doe as in the last question, of the Numerator of $\frac{2}{3}$, that is to say of 2, make still your numerator: & likewise of the numerator 2 and the denominator 3, of the $\frac{2}{3}$: make of them both your Denominator and you shall fynde $\frac{4}{3}$, then take the $\frac{2}{3}$ of 20 which are 8, and abate them from 20, & there will remayne 12: which is the number that you desire. And so is to be done of all such like reasons.

WHAT number is that from the whiche if you doe abate 17 the rest may be 19? *Answere*, Adde 17 and 19 togeather, and you shall fynde 36 which is the number that you seeke.

What number is that, from the whiche if you abate $\frac{1}{3}$, the rest may be $\frac{1}{2}$? *Answere*, adde $\frac{1}{3}$ and $\frac{1}{2}$ togeather: and you shal fynde $\frac{5}{6}$, which is the number that you demaund.

What number is that, from the which if you subtract $13\frac{1}{2}$, the rest may be $5\frac{1}{2}$? *Answere*, adde $13\frac{1}{2}$ and $5\frac{1}{2}$ togeather: and therof commeth 19 which is the number that you seeke.

What number is that from the which if you subtract his $\frac{2}{7}$, that is to say $\frac{2}{7}$ of it selfe, the rest maye bee 25? *Answere*, and a rule for such like reasons: that is to saye, from the denominator of $\frac{2}{7}$ which is 7 abate 2 whiche is his numerator, and there resteth 5 for the denominator, and thus of $\frac{5}{7}$ you haue now made $\frac{2}{5}$. Then take the $\frac{2}{5}$ of

12 whiche are 8 and adde them vnto 12, and thereof commeth 20, for the number which you desire.

5. What number is that, from the which if you doe abate his $\frac{1}{4}$, the reste may be $\frac{1}{5}$? *Aunswere*, from the denominator of $\frac{1}{4}$ which is 4: subtract his numerator 3 and there resteth 1, thus of $\frac{1}{4}$ you haue made $\frac{1}{4}$. Then multiply $\frac{1}{4}$ by $\frac{2}{5}$ and thereof commeth $2\frac{2}{10}$, the which adde vnto $\frac{2}{5}$, and you shall haue $3\frac{2}{5}$: which is the number that you seeke.

6. What number is that from the which if you abate his $\frac{2}{3}$, the rest may be $12\frac{1}{2}$? *Aunswere*. Doe as you did in the last question and you shall finde that the $\frac{2}{3}$ will be $\frac{1}{3}$. And therfore multiply $12\frac{1}{2}$ by $\frac{2}{3}$, and thereof commeth $50\frac{2}{10}$ the which adde vnto $12\frac{1}{2}$, and you shall finde $63\frac{1}{10}$, for the number that you demaunde. And thus of all such like questions.

Questions of Multiplication in fraction.

WHat number is that, which being multiplied by 13, the whole product of that multiplication shall make 221? *Aunswere*: diuide 221 by 13, and thereof commeth 17: which is the number that you seeke.

2. What number is that which being multiplied by 15, the whole multiplycation will amount to $\frac{3}{4}$? *Aunswere*: diuide $\frac{3}{4}$ by $\frac{15}{1}$, and thereof commeth $\frac{1}{20}$ which is the number that you seke.

3. What number is that which being multiplyed by 21 the whole multiplication will be $16\frac{4}{5}$? *Answere*, diuide $16\frac{4}{5}$ by $\frac{21}{1}$, and you shall fynde $\frac{4}{5}$, which is ẏ number that you demaund.

4. What number is that which being multiplyed by $\frac{1}{4}$, the multiplycation will amounte to 18? *Aunswere*: diuide $\frac{18}{1}$ by $\frac{1}{4}$, and thereof commeth 24: which is the number that you desire to know.

5. What number is that whiche if

it

to be multiplied by $\frac{3}{4}$ the whole multiplication wil be $\frac{1}{4}$: Answere, diuide $\frac{1}{4}$ by $\frac{3}{4}$ and the quotient will be $\frac{1}{3}$ which is the number that you requyre to know.

6. What number is that which being multiplyed by $\frac{1}{4}$, the prooucte of the multiplication will be $16\frac{1}{4}$: Answere, diuide $16\frac{1}{4}$ by $\frac{1}{4}$ and therof commeth $26\frac{1}{3}$ which is the number that you seeke.

Here ensueth other necessary questions which are wrought by Multiplication in broken numbers.

I Demaunde howe muche the $\frac{1}{8}$ of 20 shillinges are woyth, or what are $\frac{5}{8}$ of 20 shillinges: Answere you muste multiply $\frac{1}{8}$ by $\frac{20}{1}$ and the prooucte will be $\frac{100}{8}$; therefore diuide 100 by 8, and therof commeth $12\frac{1}{2}$ which is to saye 12 s. 6 d. and so much are the $\frac{1}{8}$ of 20 shillinges woyth.

2. I demaunde what the $\frac{1}{4}$ of $\frac{1}{7}$ of a pounde of money are woyth: that is

to say of 20 s. ? Aunswere, multiplye $\frac{1}{4}$ by $\frac{1}{5}$, and thereof commeth $\frac{1}{20}$. Then take the $\frac{1}{20}$ of 20 Shillinges, as in the last question going before, and you shall fynde 12 s. 6 pence, and so much are the $\frac{1}{5}$ of $\frac{1}{4}$ of 20 s. worth.

3. I demaunde what the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ are worth? Aunswere: multiplye 8 $\frac{1}{2}$ by $\frac{2}{3}$, or else $\frac{2}{3}$ by 8 $\frac{1}{2}$, which is all one and you shall fynde $\frac{17}{6}$. Then diuyde 34 by 6, and your quotiente will bee 5 pence $\frac{2}{3}$, and so muche are the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ worth.

4. What are the $\frac{1}{4}$ of 14 pence $\frac{1}{7}$? Aunswere: multiplie 14 $\frac{1}{7}$, by $\frac{1}{4}$, and thereof commeth $\frac{2\,1}{2\,8}$: Therefore diuide 219 by 20, and your quotiente wil be 10 pence $\frac{19}{20}$: and so muche are the $\frac{1}{4}$ of 14 $\frac{1}{7}$.

5. How manye quartets of fourthy partes are contayned in 7 $\frac{3}{4}$? Aunswere: multiply 7 $\frac{3}{4}$ by $\frac{4}{1}$ (because one whole contayneth 4 quarters) & thereof commeth 30 $\frac{3}{4}$ and so manye quarters are in the 7 $\frac{3}{4}$, that is to saye 30 quarters, and $\frac{3}{4}$ of a quarter.

6. How

6. How many thirdes are in $\frac{1}{2}$ and $\frac{1}{3}$, that is to say in 3 quarters, and $\frac{1}{4}$ of one quarter: which are $\frac{7}{8}$ by the fyfte reuuction. Aunswere: multiply $\frac{7}{8}$ by $\frac{1}{3}$ (for because that in one whole are contayned 3 thirdes) and thereof commeth $2\frac{1}{8}$, the which $2\frac{1}{8}$ doth signifie $\frac{2}{3}$, and $\frac{1}{8}$ of a thirde: and so many thyrdes are in $\frac{1}{4}$ and $\frac{1}{2}$, or in $\frac{7}{8}$, which is all one.

Questions done by Diuision in broken number.

1. What number is that, whiche being diuided by 17, the quotiente will be $13\frac{1}{2}$? Aunswere: multiply 17 by $13\frac{1}{2}$ and thereof commeth $221\frac{1}{2}$, whiche is the number that you seeke.

2. What number is that, whiche being diuided by $\frac{1}{4}$, the quotient will be $21\frac{1}{2}$? Aunswere: multiply $\frac{21}{2}$ by $\frac{1}{4}$, and thereof commeth $\frac{21}{8}$: Then diuide 63 by 4, and thereof commeth $15\frac{1}{4}$: which is the number that you seek.

3. What number is that, whiche beeing diuided by $\frac{1}{12}$, the quotient will

bee

be $\frac{2}{3}$: *Answere*: multiplie $\frac{2}{3}$ by $\frac{3}{8}$, and thereof commeth $\frac{6}{24}$, which being abbreuied are $\frac{1}{12}$, for the number whiche you requyre.

4. What number is that, whiche being diuided by $\frac{4}{5}$, the quotient will be $16\frac{2}{3}$: *Answere*, multiply $16\frac{2}{3}$ by $\frac{4}{5}$ and thereof commeth $\frac{200}{15}$. Therefore diuide 200 by 15, and thereof commeth $13\frac{1}{3}$, whiche is the number that you desire to fynde.

5. What number is that, whiche being deuided by $13\frac{1}{3}$, the quotiente will be 20? Answere, multiply $\frac{20}{1}$ by $13\frac{1}{3}$, and thereof commeth $\frac{800}{3}$, then diuide 800 by 3, and thereof commeth $266\frac{2}{3}$: for the number whiche you seeke.

6. What number is that whiche if it be deuided by $12\frac{1}{2}$, the quotient will be $\frac{7}{8}$? Answere: multiplye $12\frac{1}{2}$, by $\frac{7}{8}$, & thereof commeth $\frac{175}{16}$: then deuide 175 by 16, and thereof commeth $10\frac{15}{16}$: for the number which you desyre.

Other

Other necessary questions done by *Division of broken numbers.*

1. Demaunde what part 30 is of 70 ?
Answere: diuide 30 by 70, whiche you cannot, for they are $\frac{30}{70}$, but abbeuy thē, & they are $\frac{3}{7}$. Thus 30 are $\frac{3}{7}$ of 70.

2. If demaunde what parte 10 is of $16\frac{2}{3}$?
Answere: diuide $\frac{10}{1}$ by $16\frac{2}{3}$, & thereof commeth $\frac{30}{70}$, which, being abbreuied are $\frac{3}{7}$. And thus 10 is found to be $\frac{3}{7}$ of $16\frac{2}{3}$.

3. Moreouer, of one vnitie, what part are they of 25 ?
Answere: diuide $\frac{1}{1}$ by $\frac{25}{1}$, and thereof commeth $\frac{1}{100}$, whiche being abbreuied is $\frac{1}{40}$, and thus $\frac{1}{1}$ of 1, is but the $\frac{1}{40}$ of 25.

4. Moreouer, $\frac{1}{2}$ what part are they of $\frac{7}{13}$?
Answere: diuide $\frac{1}{2}$ by $\frac{7}{13}$, and you shall finde $\frac{13}{14}$, which abbreuied, are $\frac{13}{14}$.

5. Moreouer $\frac{1}{7}$ of 1, what part are they of $13\frac{1}{13}$?
Answere: diuide $\frac{1}{7}$ by $13\frac{1}{13}$, and you shall finde $\frac{13}{100}$, which being abbreuied are $\frac{1}{10}$. And thus $\frac{1}{7}$ of 1, are the $\frac{1}{10}$ of $13\frac{1}{13}$.

6. Moreouer $\frac{2}{3}$, what part are they of

30 *Answere*, diuide $12\frac{1}{2}$ by $\frac{10}{1}$, and you shall finde $\frac{2}{100}$ which being abbreuied, are $\frac{1}{12}$, and thus $12\frac{1}{2}$ are the $\frac{1}{12}$ of 30.

7. More, $16\frac{2}{7}$ what part are they of $57\frac{1}{7}$? *Answere*: diuide $16\frac{2}{7}$ by $57\frac{1}{7}$, & thereof cōmeth $\frac{100}{1200}$, whiche being abbreuied are $\frac{7}{24}$, and thus $16\frac{2}{7}$ are the $\frac{7}{24}$ of $57\frac{1}{7}$.

8. More, $\frac{1}{4}$ and $\frac{2}{3}$ of $\frac{1}{4}$, are quarters of $\frac{1}{3}$ of one quarter, what parte are they of 1? *Answere*, reduce $\frac{1}{4}$ and the $\frac{2}{3}$ of $\frac{1}{4}$ into a broken number by the fifte reduction, and you shall finde $\frac{1}{12}$. Aun thus the $\frac{1}{4}$, and $\frac{2}{3}$ of $\frac{1}{4}$, are the $\frac{1}{12}$ of 1 whole.

9. More, of what number are 9, the $\frac{3}{5}$? *Answere*: diuide 9 by $\frac{3}{5}$, and thereof commeth $13\frac{3}{5}$, which is the number whereof 9 are the $\frac{3}{5}$.

10. More, of what number are $\frac{2}{5}$ the $\frac{1}{2}$? *Answere*: diuide $\frac{2}{5}$ by $\frac{1}{2}$, & thereof commeth $\frac{4}{5}$: whiche is the number whereof $\frac{2}{5}$ are the $\frac{1}{2}$ of the same number.

11. More, of what number are $5\frac{1}{4}$

the

the $\frac{1}{7}$? Answere, diuide $5\frac{1}{4}$ by $\frac{2}{7}$, and you shall finde $13\frac{1}{2}$ which is y number whereof $5\frac{1}{4}$ are the $\frac{1}{7}$.

12. Note. $9\frac{2}{3}$ what part are they of $33\frac{1}{2}$? Answere, diuide $9\frac{2}{3}$ by $33\frac{1}{2}$, & therof commeth $\frac{58}{201}$: & thus $9\frac{2}{3}$ are y $\frac{58}{201}$ of $33\frac{1}{2}$ as appeareth.

The thirde parte treateth of certayne breefe Rules, called Rules of practise, with dyuers necessary questions profitable not alonelye for Merchaunters, but also for all other occupiers.

The fyrst Chapter.

Some there be, whiche doe call these rules of practise, breefe rules: for that by them many questions may bee done with quicker expedition, then by the Rule of three. There be others which call them the small multiplication, for because that the product is alwayes lesse in quantity, than the number whiche is to be multiplyed. This practise commeth not in vse, but onelye among small kyndes of numbers whiche haue ouer them, other numbers that are greater. And this beeing well considered, is no

no other thing but to conuerte lesser, and particuler kindes of number, into greater, the which may be done by the meanes of diuision in taking the halfe, the thirde, the fourth the fifte or suche other partes of the summe, whiche is to bee multiplied: as the multiplyer is part of his greater kynde, and that which commeth thereof, is worth as muche, not in quantitie, but in his owne forme and qualitie, as if you did multiplye simply the two summes, the one by the other. And for the better vnderstanding of suche conuersyons, you muste haue respecte to one of these two considerations, the first is, when one woulde demaunde this questyon. At 6 s. the yarde of Cotton, what are 18 yardes worthe, by the price. It is manifest that they are worth 18 peces of 6 pence the peece, or 18 halfe shillinges, whiche muste be turned into shillinges, in taking the halfe of 18 s. and they make 9 s. Or otherwise you must consider, that at 1 s. the yard, the 18 yardes are worth 18 s. wherefore

at

at 6 d. they shall be but halfe so muche. for 6 d. is but the ½ of 1 s. Therefore you muste take the ½ of 18 s, and they make 9 s. whiche are worth as muche as 108 d. that is to saye, as 18 tymes 6 pence.

Firste, if you will multiplye any nũber after this maner, by pence: whereof the number of the same pence doe not extende vnto 12, and thereof to bring shillinges into the produicte: you muste knowe the aliquot partes of 12, whiche are these, that is to saye, 6, 4, 3, 2, and 1, for 6 is the ½ of 12, and 4 is the ⅓ of 12, 3 is the ¼, 2 is the 1/6, and 1 is 1/12. Then for 6 d. whiche is the halfe of 1 shilling, you muste take the ½ of all the number whiche is to bee multiplyed: And that whiche commeth thereof, shalbe shillinges: if there doe remayne 1, it is 6 pence.

Aliquot parte is any euẽ part of a shilling or of a pounde or of any other thing as ½, ⅓, ¼, 1/6, &c. are called aliquot parts.

For foure pence, you muste take the ⅓ of all the number that is to bee multiplyed, and if anye vnites doe remayne, they shall be thirdes of a shillinge, euery one beinge in value 4 pence.

For

For 3 pence you must take the $\frac{1}{4}$ of al the summe: if anye vnities doe remayne they shall be fourthes of a shilling, euery one being worth 3 pence. For 2 pence you must take the $\frac{1}{6}$ of all the summe, and if any vnities doe remayne, they shall bee fyre partes of a shillinge, beeing euerye one of them worth 2 pence.

For 1 d. take the $\frac{1}{12}$ of the whole summe, if any vnities do remayne, they are the twelfeth partes of a shilling, each of them being in value 1 d. as by these examples following doth playnely appeare.

Example. j.

At 6 pence the yarde.
What are 59 yardes worth.

29 shil. 6 pence. ij.

At 4 pence the yarde.
What 82 yardes.

27 shil. 4 pence. iij.

At 5 pence the yarde.

What 97 yardes?

24 shil. 5 Pence.

At 2 pence the yarde.

What 346 yardes.

57 shil. 8 pence.

At 1 Penie the yarde.

What 343 yardes.

28 shil. 7 Pence.

Here you may see in the first example, that 59 yardes at 6 pence the yard, are worth 29 shillinges 6 d. in taking the $\frac{1}{2}$ of 59. And in the seconde example, the 82 yardes at 4 pence the yarde, are worth 27 s. 4 d. in taking the $\frac{1}{3}$ of 82.

Like-

Likewise, in the third example 97 yardes, at 3 pence the yarde, bringeth 24 shillinges 3 pence, in taking the $\frac{1}{4}$ of 97. Also in the fourth example, 346 yardes at 2 pence the yarde, maketh 57 shillinges 8 pence, in taking the $\frac{1}{6}$ of 346. And finally in the fifte example: 343 yardes, at 1 d. the yarde amount to 28 shil. 7 d. in taking the $\frac{1}{12}$ of 343. And so is to be done of all such like, when the nũber of the pence is any of the aliquot partes of 12.

But if the number of the pence bee not an aliquot parte of 12, you muste reduce them into some aliquot partes of 12, and after the aforesayde manner you shall make of them two or three productes as neede shall requyre, and adde them togeather into one summe, as 5 d. may be reduced into 4 d. & 1 d. or elle into 3 d. and 2 d. For 4 d. & 1 d. doe make 5 d. & so do 3 d. & 2 d. the like wherefore if you will worke by 4, and by 1: you muste for 4 d. take firste the $\frac{1}{3}$ of the number that is to bee multiplied, and for 1 d. take the $\frac{1}{12}$ of whole

ſumme, or rather for 1 d. ye maye take the ¼ of the product which did come of the 4 d. because that 1 d. is the ¼ of 4 d. But if you will worke by 3 d. and 2 d. you ſhall take for 3 d. the ¼ of the nũber which is to be multiplyed, and like wiſe for 2 d. the ¼ of the ſame number adding togeather both the productes. The totall ſumme of thoſe two numbers ſhall bee the ſolution to the queſtion. And in like manner is to be done of all others. As by theſe examples following may appeare.

1. Example.

At 5 pence the yard.
What will 49 yardes amount vnto.

16 ſhil. 4 pence.
4 ſhil. 1 d.

20 ſhil. 5 d.

ij.

At 7 d. the lib.
What will 54 lib cost.
18 shil. 0 d.
13 shil. 6 d.
31 shil. 6 d.

iii.

At 8 d. the peece.
What are 40 worth.
13 shil. 4 d.
13 shil. 4 d.
26 shil. 8 d.

Otherwyse.

What are 40 peeces worth.
At 8 d. the Peece.
20 shil.
6 shil. 8 d.
26 shil. 8 d.

iiii.

At 9 d. the yarde.

What are 73 yardes.

36 shil. 6 d.
18 shil. 3 d.

54 shil. 9 d.

v

At 10 d. the elle.

What are 32 elles.

16 shil. 0.
10 shil. 8.

36 shil. 8 d.

vi.

At 11 d. the lib.

What are 27 lib.

9 shil. 0.
9 shil. 0.
6 shil. 9.

24 shil. 9 d.

Here in this first example, where it is demaunded (at 5 pence the yarde) what will 49 yardes amount vnto: First for foure pence, I take the $\frac{1}{3}$ of 49 s. and thereof commeth 15 s. 4 d. then for 1 d. I take the $\frac{1}{4}$ of the same product, that is to say, of 16 s. 4 d. & that bringeth 4 s. 1 d. these two summes added together, doe make 20 s. 5 d. And so much are the 49 yardes worth at 5 pence the yarde.

For 7 d. take the $\frac{1}{3}$ and the $\frac{1}{4}$ of the whole summe which is to be multiplyed & adde them together, that is to say for 4 d. you must take the $\frac{1}{3}$, & for 3 d. the $\frac{1}{4}$: because 4 d. is the $\frac{1}{3}$ of 12 d. and 3 d is the $\frac{1}{4}$ as in the seconde example. before both appeare. Where the question is thus, at 7 d the l. what wil 54 l. coste: First for 4 d. I take the $\frac{1}{3}$ of 54: & they make 18 l. Likewise for 3 d. I take $\frac{1}{4}$ of 54, and they are 13 l. 6 d. Then I adde 18 l. and 13 l. 6 d. together, so both amount to 31 l. 6 d. & so much are the 54 li. at 7 d the li.

Otherwise, for 7 d. you shall take

firſt the $\frac{1}{2}$ of the whole ſumme for 6 d. Then for 1 d. you muſt take the $\frac{1}{4}$ of ỳ ſame product, and adde them together, ſo you ſhall haue the like ſumme as before.

For 8 pence, you muſt firſt take $\frac{1}{2}$ of the whole ſumme for 4 pence: and an other $\frac{1}{2}$ for other 4 d. and adde them togither, as in the example doth euydently appeare. Where the queſtion is thus, at 8 d. the peece, what are 40 peeces worth? Firſt, for 4 d. I take the $\frac{1}{3}$ of 40, which is 13 s. 4 d. Agayne I take another $\frac{1}{2}$ for the other 4 pence: Theſe two ſummes being added togeather, do make 26 ſhillings 8 pence: and ſo much are the 40 peeces worth, at 8 pence the peece, as in the thyrde example aboueſayd doth appeare.

Other wayes: for 8 pence you may take firſte the $\frac{1}{2}$ of the whole ſumme for 6 d. Then for 2 d you ſhall take the $\frac{1}{4}$ of the product which did come of the ſayd $\frac{1}{2}$, and adde them together, ſo ſhall you haue lykewiſe the ſolution of the

queſtyon

question. As in the same thyrde example of 40 yardes, I take firste the $\frac{1}{2}$ of 40 for 6 d. and thereof commeth 20 s. Then for 2 d. I take $\frac{1}{3}$ of the sayde product, that is to say of 20 s. which bringeth 6 s. 8 d. these two summes (20 s. and 6 s. 8 d.) I adde together, & they make 26 s. 8 d. as before.

For 9 d. you must take the $\frac{1}{2}$ and the $\frac{1}{4}$ of the whole summe, and adde them together: or else for 6 d. take firste $\frac{1}{2}$ of the whole summe, thē for 3 d. take the $\frac{1}{2}$ of the same product, because 3 d. is ỹ halfe of 6 d. And 6 d. added with 3 d. bringeth 9 d. as by the fourth example where it is demaunded after this sorte, at 9 d. the yard: what are 73 yardes worth? Firste for 6 d. I take the $\frac{1}{2}$ of 73, and thereof commeth 36 s. 6 d. Then for 3 d. I take $\frac{1}{2}$ of the same 36 s. 6 d. which is 18 shil. 3 d. these two summes I adde together, and they make 54 s. 9 d. as in the sayde fourth example is euident.

For 10 d. take firste the $\frac{1}{10}$ then the $\frac{1}{4}$ of the whole summe, and adde them

together, and it is done.

For 11 li. take firste $\frac{1}{2}$ for 4 li, secondly another $\frac{1}{2}$ for other 4 li. and thyrdlye $\frac{1}{4}$ for 3 li. (of all the whole summe) and adde them togeather, and that aunswereth the questyon.

Or elſe for 11 li. take firſt the $\frac{1}{2}$ for 6 li. then the $\frac{1}{3}$ of the whole ſumme for 4 li, & finally the $\frac{1}{4}$ of the laſt producte, for 1 li. adding them togeather, and it will be like to the other.

Likewyſe by the ſame reaſon when you will multiplie (by ſhillinges) anye number that is vnder 20 s. you ſhall haue in the producte pounds, if you knowe the aliquot partes of 20, which are theſe: 1, 3, 5, 4, 2, and 1. For 10 is the $\frac{1}{2}$ of 20, 5 is the $\frac{1}{4}$ part, 4 is the $\frac{1}{5}$. 2 is the $\frac{1}{10}$. and 1 is the $\frac{1}{20}$.

Then for 10 s. whiche is the $\frac{1}{2}$ of a pounde, you muſt take the $\frac{1}{2}$ of the nũber which is to bee multiplyed, & you ſhal haue pounds in the producte. If there doe remayne 1, it ſhall bee worth 10 ſhillinges.

For

For 5 shillinges you must take the $\frac{1}{4}$ of the number which is to bee multiplyed, and if there doe remayne anye vnities, they wall be fourth partes of a pounde, euerye vnitie beeing in value 5 s.

For 4 s. you muste take the $\frac{1}{5}$ of the number whiche is to bee multiplyed: And if there doe remayne any vnities, they shall bee fifte partes of a pounde euery vnity being wozth 4. shillinges.

Example.

At 10 shillinges the peece.
What are 75 peeces worth.

37 lib. 10 shil.

At 5 shil. the yarde.
What are 89 yardes worth.

22 lib. 5 shil.

At 4 shil. the elle.
What are 93 elles worth.

18 lib. 12.

For

For 2 shillinges you must take the $\frac{1}{10}$ of the number that is to bee multiplyed. Wherefore if you will take the $\frac{1}{10}$ of any number, you must separate the laste sygure of the same number, (whiche is neareste your righte hande) from al the other sygures, with a smal strike or dashe with a penne. For all the other sygures which doe remayne toward your left hande from the same figure that you doe separate shall bee the sayd $\frac{1}{10}$ of a pounde: and that sygure so separated toward your righte hande shall be so many peeces of 2 shillings the peece: the which figure must be doubled to make thereof shillinges, as by these examples appeareth.

At 2 shil. the lib.
What are 9|8 *lib. worth.*

9 lib. 16 shil.

At 2 shil. the dosen
What are 40|3 *dosens worth.*

40 lib. 6 shil.

Hereby

Hereupon dependeth another exact way for to multiplye by shillinges (if the number of shillinges bee euen) which is thus: you shall take ½ ỳ number of the same shillinges, and conuert them into peeces of 2 shillinges. Then by the number of this halfe, you must firste multiplye the figure (towarde your right hand, of the number whiche is to be multiplyed, and if there be any tennes in the same producte, those must you reserue in your mynde, but if (with the same, or else without the same) you doe finde any diget number, ỳ same diget number shall you double, & put it in the place of shillings. Then must you proceede to the multiplicatiõ of the other figures, adding vnto ỳ producte the tennes whiche you before reserued, and thereof shall come pounds.

Now for your better vnderstanding of this which hath bene sayd, and by ỳ way of example: I will propone vnto you this question.

At 8 shillinges the grosse, what are 97 grosse worth after the rate?

Fyrste

First in this example I take halfe the number of shillinges as before is taught that is to saye of 8 shillinges whiche is 4 shillinges: this 4 shillinges I put apart behinde a crooked lyne, right agaynst 97 towardes the left hande, as here you may see, and as hereafter appeareth by diuers examples.

At 8 shil. the grosse.

4)*What will* 97 *grosse cost.*

38 lib. 16 shil

At 6 shil. the yard.

3)*What* 99 *?*

29 lib. 14. shil.

At 12 shil.

6)*What* 345 *?*

207 lib. 0 shil.

At 14 shil.

7)*What* 210 *?*

147 lib. 0 shil.

Now in the first example, where it is demaunded at 8 s. the grosse, what are 97 grosse: First the ½ of 8 s: whiche is 4 s. being set apart betwyne the crooked lyne as before is sayd, then I multiplie the 97 by 4, saying first 4 times 7, is 28. I double the diget number 8, and that maketh 16, the whiche 16, I doe put vnder the lyne in the place of shillinges, and I keepe the two tens in my mynde, which here in worke doe represent 2 li. Then secondlye I multiplie 9 by the sayd 4, and therof commeth 36, whereunto I adde the 2 li. which before I did reserue, and they make 38. Therefore I put 38 vnder the lyne in the place of pounds, and the whole summe will bee 38 li. 16 s. Thus much are the 97 grosse worth, at 8 shillinges the grosse: the lyke is to be done of all other. As of 12 s. in multiplying by 6. Likewise of 6 s. if you multiplye by 3: also of 14, if you multiplie by 7. And so of all euen numbers after the same maner.

For 1 shilling you must take the ½ of

of the $\frac{1}{10}$ part of any number that is to be multiplied.

And if anye thinge doe remaine they are shil. Thus by this manner, shil. are conuerted into pounds, for it is euen like as though you did deuide thē by 20 s. as by this example in the margent doth appeare.

At 1 *shil.*
What 35 0.
17 *lib.* 10 *shil.*

Where it is demaunded at 1 s ỹ yard the peece or any other thing, what are 350 yardes or peeces worth.

First I seperate ỹ last figure of 350 next to my right hande, which is the 0, with a lyne betweene it, and the figure 5. Then I make a lyne vnder the 35 0, & I take the $\frac{1}{2}$ of 35, after this maner, saying the $\frac{1}{2}$ of 3 is 1, and 1 remayneth, whiche remayne signifieth 10, in that seconde place: Then I put 1 vnder the lyne agaynst 3, and I proceede to the rest, saying the halfe of 15 is 7, (the which 15 came of the 1 that remayned, & of the 5 in the first place,) I put 7 vnder the line, right agaynste

5.

6, and they make 17 li. The 1 whiche did last remayne, is 10 s. Nowe I put 10 s. aparte vnder the lyne, and the whole summe is 17 li. 10 s. so muche are 350 worth at 1 s. the peece.

But when the number of shillinges is not some aliquot part of 20 s, you must then conuerte the same number of shillinges, unto the aliquot partes of 20, and make two or three productes as neede shall require, the which must bee added togeather after this manner following.

For 3 shillinges, you must first take for 2 s. the $\frac{1}{10}$ of the number that is to be multiplyed, then for 1 shilling, you muste take the $\frac{1}{2}$ of the producte which did come of the same $\frac{1}{10}$ parte: and adde these two summes togeather, as appeareth by this example following.

At 3 s. the peece of any thing, what shall 614 peeces cost me after the rate? Fyrste, for 2 shillinges I take the $\frac{1}{10}$ of

684, whiche is 68, in separating the last fygure 4, whiche I must double and they bee 8: I set 8 s̄ apart from the place of poundes, and then I haue 68 pounds 8 s̄. for the $\frac{1}{10}$ parte that is to say for the 2 s̄. secondlye for 1 s̄, I take the $\frac{1}{2}$ of the product, that is to say, of 68 li. 8 s̄. which is 34 li. 4 s̄. and I put the same vnder the 68 li 8 shil. Then finallye I adde those two summes togither, that is to say, 68 li. 8 s̄. and 34 li. 4 shil. so they make 102 li. 12 s̄. and so much are ẏ 684 peeces worth at 3 shil. the peece, as maye appeare in the margent.

At 3 shil.
Was 68 | 4.
68 li. 8 shil.
34 li. 4 shil.
102 li. 4 shi.

For 6 shil. take $\frac{1}{10}$ of the number which is to be multiplyed: ẏ is to saye take fyrst $\frac{1}{10}$, then double the producte of the same $\frac{1}{10}$, and adde them together Or otherwise for 4 s̄, take first the $\frac{1}{5}$ of the number that is to bee multiplyed, then for 2 s̄. take $\frac{1}{2}$ of the product, and

add

adde them togeather. $\frac{1}{5}$

Or else take the 2 shil. the $\frac{1}{10}$ of the whole summe, then for 1 shil. take the $\frac{1}{5}$ of the product, and adde them togeather. $\frac{1}{2}$

Likewise for 3 shil. take first for 2 s. the $\frac{1}{5}$, then for 1 shil. take the $\frac{1}{5}$ of the number which is to be multiplyed, and adde them togeather.

For 8 shil. ages take the $\frac{1}{5}$ at two sundry times, that is to say, first $\frac{1}{5}$ for 4 shil. and then as muche more for other 4 shil. and adde them togeather.

For 9 shil. take first the $\frac{1}{4}$ and lykewise the $\frac{1}{5}$ of the number, that is to bee multiplyed, and adde them togeather.

For 11 shil. take first the $\frac{1}{2}$ for 10 s. Then for 1 shil. take the $\frac{1}{10}$ of the product, and add them together, or else for 5 s. take the $\frac{1}{4}$: then for 4 s. take the $\frac{1}{5}$, & lastly for 2 s. take the $\frac{1}{2}$ of the laste product, and adde them togeather.

For 12 shil. take firste the $\frac{1}{2}$ for 10 shil. then for 2 s. take the $\frac{1}{5}$ part of the product, and adde them togeather.

For 13 s. take the $\frac{1}{4}$, then the $\frac{1}{5}$, and a-

gayne another $\frac{1}{2}$ of the number which is to be multiplyed, and adde the productes togeather, that is to say first for 5 shil. take the $\frac{1}{23}$ then for 4 shil. take the $\frac{1}{5}$. And agayne another $\frac{1}{5}$ for the other 4s, and adde the three productes togeather, the like is to bee done in all others, when the price of the thing which is valued, is only of shillings, as by these examples following doeth playnly appeare.

At 6 shillings.

What 67.

13 lib.	8 shil.
6	14
20 lib.	2 shil.

At 7 shil.

What 347.

86	15
34	14
121 lib.	9 shil.

At 8 shil.

What 540.

108	lib.	0 shil.
108		0
216	lib.	0 shil.

At 9 shil.

What 530.

53.		10.
48.		00.
103	lib.	10 shil.

At 11 shil.

What 159.

79		10.
7		19.
87	li.	9 shil.

At 8 shil.

What 349.

174		10
34		18
209	lib.	8 shil.

O ij

At 13 shil.	
What 267.	
06.	1.
53.	8.
53.	8.
173 lib.	11 shil.

Likewise in multiplying by pence, you shall haue (at the fyrst instant) poundes in the producte in case you knowe the aliquot partes of the $\frac{1}{10}$ of a pound or of 24 pence, which are these, 12, 8, 6 4, 3, and 2. For 12 is the $\frac{1}{6}$ of 24: 8 is the $\frac{1}{3}$: 6 is the $\frac{1}{4}$: 4 is the $\frac{1}{6}$: 3 is the $\frac{1}{8}$: and 2 the $\frac{1}{12}$: but for 12 d. whiche is 1 shil. I haue before made mention thereof.

For 8 d. you must take the $\frac{1}{3}$ of the $\frac{3}{10}$ and the rest which are the peeces of 8 d. must bee doubled to make of them peeces of 4 d. And of the same number beeing doubled you must take the $\frac{1}{3}$ which will be shillings, and if there do yet remayne any thing, they are thirds of a shilling beeing in vallue 4 pence the peece.

For

For 8 d. take the $\frac{1}{2}$ of the $\frac{1}{10}$, and of that remayneth, you must take the $\frac{1}{2}$ which shall be shillinges, if there doe yet remayne, it shall be in value 6 pence.

For 4 d. you must take the $\frac{1}{4}$ of the $\frac{1}{10}$, and of that which resteth take the $\frac{1}{3}$ to make thereof shillinges: if any thing doe yet remayne, they are thirdes of a shilling, beeing in value 4 pence the peece.

For 3 pence take the $\frac{1}{4}$ of the $\frac{1}{10}$, and of that remayneth, take the $\frac{1}{4}$ to make of them shillinges, if anye thing doe yet remayne, they are fourthes of a shilling, euery one of the being worth 3 pence.

For 2 d take the $\frac{1}{5}$ of the $\frac{1}{10}$, and of that which resteth take the $\frac{1}{10}$, d which are shillinges if there doe still remaine any thing they shall be fiue partes of a shil. euery one being in value 2 d.

For 1 d you shal vnderstand that it is not possible with ease to bring of pence poundes (into the prouncte) vppon the totall summe: But first you must bring

them into shillings by the order of the second rule of this chapter, and then afterward you shall conuert them into pounds, if nede so require, as by these examples following may appeare.

At 8 Pence.

What 59 6.

19 lib. 17 shil. 4 d.

At 6 d.

What 67 8.

16 lib. 19 shil.

At 4 d.

What 93 4.

15 li. 11 shil. 4 d.

At 3 d.

What 57 1

7 lib. 2 shil. 9 d.

At 2 d.

What 36 4.

3 lib. 0 shil. 8 d.

At 1 d.

What 67|6.

25 lib. 12 shil. 8 d. 1

2 lib. 16 shil. 4 d.

But if the number of pence, bee not an aliquot parte of 24. pence. Then must you bring them into the aliquot partes of 24, and make thereof diuers productes, which must be added together as shall hereafter appeare.

For 5 pence, you shall first take for 3 pence, then for 2 pence, and adde the together, according to the instruction of the last rule. Or else first take for 4 pence, and then for 1 d.

For 7 d. first take for 4 d, then for 3 pence, and adde them together.

For 9 d. first take for 6 d, then for 3 pence, adding them togeather.

For 10 d. first take for 6 d. then for 4 pence, and adde them together.

For 11 d, take first for 8 d, then for 3 d. and adde them together: as by these examples following both appeare.

What 26 4.

If you wil multiply any nūmber by shillinges and pence, beeing both togeather, you must take first for the shil. according to the instruction of the third rule of this first chapter, then take for the pence after the order of that rule before mentioned, but if there be anye aliquot partes of 1 li. conteining both shillinges and pence, then for those partes you shall take suche like parte of the number that is to be multiplyed as the nūber is part of 1 li. the whiche aliquot partes are these 6 s. 8 d: 3 s. 4 d: 2 s 6 d: and 1 s 8 d. For 6 s. 8 d. is the $\frac{1}{3}$ of a li: 3 s. 4 d: is the $\frac{1}{6}$ of a li: 2 s 6 d. is the $\frac{1}{8}$: and 1 s. 8 d. is the $\frac{1}{12}$ of a li. or of 20 s. And therefore for 6 s. 8 d. you must take the $\frac{1}{3}$ of the number that is to be multiplyed: and if anye thing doe remayne, they are thyrdes

of

of a li. euery one beeing worth 6 s. 8 pence.

For 3 s. 4 d. you must take the $\frac{1}{6}$ of the number which is to be multiplyed, and if any thing doe remayne, they are sixth parts of a li. euerye one being in value 3 s. 4 d.

For 2 s. 6 d. you must take the $\frac{1}{8}$ if anye thing bee remayning, they are eyghth partes of a li. each one being worth 2 s. 6 d.

For 1 s. 8 d. you shall take the $\frac{1}{12}$ of the number that is to bee multiplyed, and if there doe anye thing remayne, they are twelfth partes of a pounde euerye one beeing in value 1 shilling, 8 pence.

At 6 *shil.* 8 *d.*
What 647.

215 *lib.* 13 *shil.* 4 *d.*

At 3 *shil.* 4 *d.*
What 220.

36 *lib.* 13 *shil.* 4 *d.*

At

At 2 shil. 6 d.
What 47.

5 lib. 17 shil. 6 d.

At 1 shil. 8 d.
What 400.

33 li. 6 shil. 8 d.

Here shall you accustome your selfe to multiplye by all sortes of summes, being composed of shillinges and pence which may come in vse or practise, as thus, for 1 s. 1 d: 1 s. 2 d: 1 s. 3 d: for 1 s. 4 d: Likewyse for 2 s. 1 d: 2 s 2 d: 2 s. 3 d: 2 s. 4 d. And so of all other, considering moreouer many subtile abbreuiations, which happen oftetimes, that are easye to bee conceyued As thus, at 11 s, 3 d, after that I haue taken first the ½ for 10 s. Then for 1 s 3 d. I take the ¼ of the product, because 1 s 3 d, is the ¼ of 10 s. in taking the sayde ¼ of the producte. And by this meane, when ye haue taken one product, ye may often times vppon ẏ same take another more breefely than vpon the Rule. 7.

the summe that is to bee multiplyed, which thing you must foresee.

At 11 *shil.* 3 *d.*
What 53.

26.	10.	0.
3.	6.	3.
29 *lib.*	16 *shil.*	3 *d.*

At 6 *shil.* 3 *d.*
What 58.

14.	10.	0.
3.	12.	6.
18 *lib.*	2 *shil.*	6 *d.*

At 12 *shil.* 8 *d.*
What 64.

32.	0.	0.
6.	8.	0.
2.	2.	8.
40 *lib.*	10 *shil.*	8 *d.*

But if you would multiply by pounds shillinges and pence, being altogether First you must wholye multiplye by

poundes

pounds. Then take for the shillinges and pence, as in the 6 rule of this chapter is playnely declared. And as by examples following may appeare.

Rule 9. So these rules do serue both to buy and sell. As at such a price the elle the yard, the peece, the pounde waighte or any other thing: howe muche is such a thing, or so many elles worth. Likewise they are very necessary to cõuert all peeces of gold and siluer into pounds: for I may as well saye, at 4 shil. 8 d. The frenche crowne, what are 135 crownes worth, as to say, at 4 shil. 8 d. the yard of cloth, what are 134 yardes worth.

Rule 10. When any one of the summes which is to be multiplied, is composed of many denominations: and the other being of one figure alone: then shall yee multiply all the denominations of the other summe, by the same one figure beginning still with that summe which is least in value towardes your righte hande, and bring the productes of those pence into shillinges, and the products of the shillinges into pounds, as by this example doth appeare.

At 3 *li.* 9 *shil.* 8 *d. the peece.*

What 7.

24 *li.* 7 *shil.* 8 *d.*

But

But if in any of the numbers which are to be multiplyed, there bee with it a broken number, you must (according to his denominator) take one or manye partes of the other number, as neede doth require: & set the number which commeth thereof vnder the productes adding the same togeather, as thus, Rule 11.

At 5 li. 7 s. 8 d. the grosse, what shall 34 grosse $\frac{1}{2}$ coste? First you shal mul-

	At 5 li.	7 shil.	8 d.
	What 34 $\frac{1}{2}$.		
tiply 5 li. 7 s.	170 lib.	0 shil.	0
8 d. by 34	11	6	8
grosse saing	1	14	0
3 tymes 34	2	13	10
to make 170 li. then for 6	185 li.	18 shil.	6 d.

s. 8 d. take the $\frac{1}{3}$ of 34, which is 11 li. 6 s. 8 d. Thirdly, for 1 s. take 34 shil. which is 1 li. 14 s.

Finally for the $\frac{1}{2}$ grosse you must take $\frac{1}{2}$ of the 5 li. 7 s. 8 d. which is 2 li 13 s 10 d. And then adde yon foure productes together, so you shall fynd that the 34 grosse $\frac{1}{2}$, at 5 pound, 7 shillings

8 pence the grosse is worth 185 li. 14 s. 6 d. as appeareth in the example aforesaye.)

Ans. as in this last example you did for the $\frac{1}{7}$ grosse, take halfe of the pryce, (that one grosse was worth) And therefore because 1 grosse is worth 5 pound 7 shillinges, 8 pence: the $\frac{1}{7}$ grosse must be worth halfe so much. Also likewise if you haue the $\frac{1}{3}$ of a grosse, or of any other thing, you must take the $\frac{1}{3}$ of the price, that one grosse is worth. And in like maner for the $\frac{1}{4}$ of anye thing you shall take the $\frac{1}{4}$ of the price, also if you haue $\frac{2}{3}$, take the $\frac{2}{3}$ of the price that one is worth, and so of all other fractions, as by these examples following doeth appeare.

At a lib. 6 shil. 8 d.

What 46 $\frac{1}{2}$.

20 li. 3 shil. 4 d.

At 8 lib. 0 shil. 9 d.
What 54 ½.

432	0	0
1	7	6
8	13	6
2	13	7

436 li. 14 shil. 1 d.

At 3 lib. 16 shil. 8 d.
What 17 ½.

51	0	0
8	10	0
5	13	4
1	18	4
0	1	2

61 li. 00 shil. 10 d.

12. If you will make the proffe of these rules aforesayde, you muste fyrste abate the summe of money whiche the fraction of the multiplicacion doeth importe from the totall summe. And diuide the reste of the pounde of ỹ sayde totall summe, by the whole multiplicand, the fraction onely accepted. And

if any thing doe remayne after the diuision is made, that remayne shall be multiplyed by 20: and vnto the product of that multiplication, you shall adde the shillinges, whiche remayned of the rest of the totall summe. Againe if anye thing doe remayne after the same diuision you must multiplye the same by 12, and vnto the producte adde the pence of the totall summe that remayned, if any be left, and thus if yee haue truly wrought you shall fynde agayne the higher summe of your question, that is to saye, the price that one grosse or anye other thing is worth, whereof the question is demaunded.

Or otherwise, reduce the remayne of the totall summe (the value of the money that the fraction is worthe, being fyrste reduced) all into pence, in multiplying the pounds by twenty, and the shillinges by 12, adding thereunto the shillinges and pence, whiche are ioyned with the remaine of the said totall summe if any such be, then diuide those pence by the foresayde num-

ber

ber that is to be multiplied, ỹ fractions of the same number being also abated. So shall you finde the ꝑice that one peece, one grosse, or any other thing is valued at. As in the fyrst of the 3 last examples going before, where the total summe is 201 poundes, 18 shillinges frō the which I doe abate the ꝑice of the halfe grosse, which is 2 li. 3 s. 4 d. the rest is 199 li. 6 s. 8 d. which being reduced into pence, ỹ maketh 47840 I diuide the same by 46, and thereof commeth 1040 pence. Then I diuide that 1040 pence, by 12: and they bring 86 shillings 8 pence, that is to say 4 li. 6 shillinges, 8 pence, whiche is the ꝑice that one grosse or any other thing did cost, as in the fyrst example doth appeare.

The like is to be done of any maner of thing that is solde by the hundred, after 5 score to the hundred. As thus, at 12 pounds, 7 shillinges, 6 d. the 100 poundes waight, what shall 374 pounds weight cost? You shall first multiply 12 pounds, 7 shillinges, 6

pence, by $\frac{3}{5}$; that is to say by thre hundreth. Thē for 53 li. weighte you shall take the $\frac{1}{2}$ of 12 li. 7 s. 6 d. bicause 50 li. is the $\frac{1}{2}$ of 100 li. Likewise for 20 li. weight whiche is the $\frac{1}{5}$ of 100 li. you shall take the $\frac{1}{5}$ of 12 li. 7 s. 6 d. lastly for 4 li. weight you must take the $\frac{1}{5}$ of the last producte This done, you muste adde all these productes into one summe whiche will make the summe of 46 li. 5 s. 7 d. $\frac{4}{5}$; as by this example aboue written doth appeare.

At 12 lib. 7 shil. 6 d.		
What 374.		
37.	2.	6
6.	3.	9
2.	9	6
0.	9.	10 $\frac{4}{5}$
46 lib.	*5 shil. 7 d.* $\frac{4}{5}$	

The proofe is made by reducing the totall summe into pence. And to diuide the producte by the number that is to be multiplied, that is to saye by 374, likewise diuide the quotient produced of that firste diuision by 12; so shall you fynde agayne the higher summe 12 pound 7 s. 6 d. whiche is the

price

price of 100 li weight as before.

Also the like may be done of oure vsuall waight here in England, which is 112 pound, for euery hundred pound waight) in case you knowe the aliquot partes of a hundred, that is to saye, of 112 pounde waight, whiche are these 56 li, 28 li, 14 li, and 7 li. For 56 li. is the $\frac{1}{2}$ of 112. 28 li. is the $\frac{1}{4}$ of 112 li 14 li is the $\frac{1}{8}$, and 7 li is the $\frac{1}{16}$.

Therefore, for 56 li. take the $\frac{1}{2}$ of the summe of money that the 112 pounde waight is worth.

For 28 pound take the $\frac{1}{4}$ of the summe of money that the 112 pound is worth,

For 14 li. take the $\frac{1}{8}$ of the summe that the C. is worth.

For 7 li take the $\frac{1}{16}$ of the summe of money that the C is worth.

As thus, at 3 li. 6 s. 8 d. the hundred pounds waight, that is to say, the 112 li. What shall 24 hundred, 3 quarters 21 li. waight cost after the rate.

First, you shall multiply 24 hundred by 3, which is the 3 li. and thereof will come 72 li, then for 6 s. 8 d. which is

the ½ of 20 s. you shall take the ½ of 24, whiche is 8 li: for 24 Nobles maketh 8 li. afterwarde, for the 3 quarters of ỳ C. you shal first for the 56 li. take ỳ ½ of 3 li. 6 s. 8 d. because 56 li. is ỳ ½ of the C. and therof commeth 1 li. 13 shil 4 d. then for 28 li. (which is the quarter of a C.) you shall take the ½ of 3 li. 6 s. 8 d. or else the ½ of the product, which cõmeth last of 56 li. which is 16 s. 8 d. likewise for 14 li. you must take the ½ of 3 li. 6 s 8 d. which is 8 s. 4 d. or else the ½ of the product ỳ commeth of 28 li. which is all one. Finally for 7 li. take the ½ of 3 li. 6 s. 8 d. or else ỳ ½ of ỳ last product that cõmeth of 14 li. ỳ therof cõmeth 4 s. 2 d. Then adde all these products together, and the totall summe will be 83 li. 2 s. 6 d. so much are the 24

	At 3 li. 6 shil. 8 d.	
What 24 C. 3 qu. 21 li.		
	72.	0. 0.
	8.	0. 0.
	1.	13. 4.
		16. 8.
		8. 4.
		4. 2.
	83 li.	2 sh. 6 d.

C. 3

C. 3 quarters, & 21 li. waight worth after 3 li. 6 s. 8 d. the hundreth, as appeareth in the margine.

The proofe hereof is made like to the other proofes aforesayde, sauing that where in those proofes, you abate the price of the money that the fraction was worth, from the totall summe. Here in this example (and in such, & the like) you must abate the price of ꝑ money that the odde waighte amounteth vnto, (ouer and aboue the iuste hundreths) from the said totall summe: the rest thereof shall you conuert into pence, diuiding the product of the multiplication by the iuste number of the number of the hundreds, so shall you finde the pence, that one hundreth is worth: whiche you shall bring into pounds by the order of diuision, and so of all other.

The second chapter treateth of the *Rule of three composed, the which is distinct into foure rules, eche of them differing the one from the other.*

There belongeth to the fyrste and seconde partes of the Rule of three, composed alwayes 3 numbers, whereof (in the fyrste part of the rule of three composed) the second number, and the fifte, are alwayes of one semblaunce, and like denomination, whose rule is thus. You must multiplye the fyrst number by the second, and that shal be your diuisor: then multiply the other three numbers, the one by the other, to bee your diuidend.

Example of this fyrst part. If 100 crownes in 12 moneths, doe gayne 15 li. what will 60 crownes gayne in 8 monthes. *Answere*, First multiply 100 Crownes by 12 monthes: and thereof commeth 1200 for your diuisor. then multiply 15 li. by 60 crownes, & by 8 monthes, and you shall haue 7200, wherfore diuide 7200 by 1200, and thereof commeth 6 li. so manye li. wil 60 crownes gayne in 8 monthes: this question may be done in the double rule of 3, that is to say by the rule of 3 at 2 times. But yet this rule of 3 com-

poled

poſed is more breefe.

Crownes. months. poũds. crownes. months.

100 12 15 60 8

7200

1200

2. In the ſecond parte of the rule of three compoſed, the thyrd number is like vnto the firſt, whereof the rule is thus, you muſt multiply the third number by the fourth, and the product ſhall be your diuiſor, then multiply the firſt number by the ſecond, and the product thereof by the firſt, the which number ſhall be your diuidend, or number that is to be deuided, as by example.

When 60 crownes in 8 months doe gaine 6 li. in how many months will 100 crownes gayne 15 li. *Anſwere:* Multiply the thyrde number 6, by the fourth number 100, and thereof commeth 600, which ſhall be your diuiſor, then multiply the firſt number 60 by the ſecond number 8, and the pro-

duct

duct thereof by the fift number 15 and thereof will come 7200: then diuide 7200, by 600, and the quotient will bee 12, in so many monthes will 100 crownes gayne 15 li. This question may likewise be done by the rule of 3 at 2 times.

Crownes,	months,	poūds,	crownes,	poundes.
60.	8.	6	100	15

1
7200 monthes.
600 (12

In the thyrde parte of the rule of 3 composed, there may be 5 numbers, or more: and in this rule, the fyrst number and the last are alwayes dissemblaunt and of vnlike denomination the one to the other: and the question is from the last number vnto the fyrst, whereof the rule is thus: you muste multiplye that number which you woulde knowe by those numbers whiche doe giue the value, & diuide the product of the same by the multiplication of the numbers

which

whiche are alreadye valued, as by example. If 4 deniers Parisis bee worth 5 deniers Tournois, and 10 deniers tournois, be worth 12 deniers of Sauoy, I demaunde howe many deniers Parisis, are 8 deniers of Sauoy worth Answere, multiplie 8 deniers of Sauoye (whiche is the number that you would know) by 4 deniers Parisis, and by 10 deniers tournois which are the nũbers ỳ giue the valuc, & they make 320: then multiply 5 de. tournoys, by 12 deniers of Sauoy, whiche are the numbers already valued, & they make 60. Finally, diuide 320 by 60, and you shal finde 5 deniers $\frac{1}{3}$ parisis, so much are the 8 deniers of Sauoy worth.

Parisis. tournois. tournois. Sauoy. Sauoy.
4 ℔. 5 ℔. 10 ℔. 12 ℔. 8 ℔.

320 *Pari.*
60 (5 ℔. 1/3

In the fourth part of the rule of three composed, the fyrste number and the last

laſt are alwayes ſemblaunt and of one denomination, & the queſtion of this rule is alwayes from the laſt number, to the laſt ſauing one. Whereof there is a rule which is thus: You muſt multiplye that number which you woulde know, by the numbers that are alreadye valued, and diuide the product of the ſame by the multiplication whiche commeth of the numbers that giue the value, as by example.

If 4 deniers Pariſis, be worth 5 deniers Tournois, & 10 deniers Tournois be worth 12 deniers of Sauoye: I demaunde how many deniers of Sauoy are 15 deniers Pariſis worth.

Anſwere. Multiplye 15 deniers Pariſis that you would knowe, by 5 Deniers Tournois, and by 12 deniers of Sauoy, which are the numbers alreadie valued, & they make 900, diuyde the ſame by 4 times 10, which are the numbers that doe giue the value, that is to ſay by 40, and you ſhall finde 22 deniers ½ of Sauoy: ſo muche are the 15 deniers Pariſis worth.

Parisis.	*tournois.*	*tournois.*	*Sauoy.*	*Parisis.*
4d.	5d.	10d.	12d.	15d.

12
~~9~~~~0~~ 0 *Sauoy.*
~~4~~~~4~~ 0 (22 d. $\frac{1}{2}$.

The thirde Chapter treateth of questions of the trade of Marchandise: in the which is taught the rule of three in fractions, beginning at the fift question following.

If 31 Deuonsh. Dosens, doe cost me 100 li. 15 shil. what shall 4 dosens cost after the same rate? *Answere.* first bring the 100 li. 15 shil. all into shillinges, in multiplying the 100 li. by 20, and adding to the producte the 15 shil, and thereof commeth 2015 shil. then multiplye 2015 by the third number 4, and diuide the product by 31, & the quotient will be 260 s. The which diuide agayne by 20, and thereof commeth 13 li. And so much are the 4 Dosens worth.

Dosens

Dosens. lib. ſhil. Dosens.
31. 100. 15. 4

20

2015

4

8060

1.
28

8000 (160.

2112

33

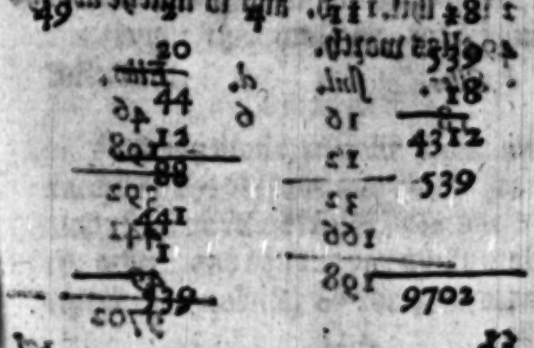
If 4 dosens bee wozth 13 li. what are 31 Dosens wozth by the ryce? Answere. Multiply 31 by 13, & therof commeth 403. The whiche you shall diuide by 4, and thereof commeth 100 li. ½. which ½. are 15 s. and so muche are 31 Dosens wozth as before.

Dosens. lib. Dosens.
4 13 31
13
93
31
403

403

4AA (100 li. ½.

3. If 49 elles be worth 2 li. 4 s. 11 d what are 18 elles worth by the pryce? Firste you muste bring 2 li. 4 s. 11 d. all into pence, in multiplying 2 li. by 20, maketh 40: adde thereto 4 shillinges they make 44 s: the whiche multiplye by 12 d. and they make 528 d, wherevnto adde 11 d. all is 539 d. the whiche 539 d. must bee your seconde number in the rule of three, then multiply 439 by the thyrd 18 number, & therof commeth 9702, diuide ỹ same by 49 & you shall haue in your quotient 198 d. the which diuide by 12, and you shall finde 16 s. 6 pence: so much are the 18 elles worth.



4. If 18 elles be worth 16 s. 6 pence what are 49 elles worth by the pryce? Answere, bring 16 shil. 6 p. into pence in multiplying 16 s. by 12, and there of commeth 198 p. with the 6 p. added to it, then multiply 198 by 49, the product will be 9702. The which diuide by 18 elles and thereof commeth 539 p. Then diuide 539 p. by 12 s. & the product thereof by 20. So shall you haue 2 li. 4 shil. 11 p. and so muche are the 49 elles worth.

Elles.	shil.	d.	Elles.
18	16	6	46
	12		198
	32		392
	166		441
	198		49
			9702

17	1
448	181
9702 (539	838 (44 shil.
1888	122
11	1

Note that whereas in the first part of this booke, I haue set foorth the rule of three, both in whole numbers, and also in fractions: now I will shew you howe to doe the sayde rule of three, in fractions more at large. And therefore for ẏ I would haue you to vnderstād ẏ same generally, you must first consider if the three numbers that shall be proponed (in anye question of the sayde rule of three) bee all fractions, yea or no: which if they be all three numbers fractions: then must you worke as followeth.

First you must multiplie the numerators of the seconde and thirde fractions in your rule of three, the one by the other, and agayne you muste multiplye that product, by the denomina-

tor of the first fraction: And the number whiche commeth of this laste multiplication shall bee your deuidende or number that must be deuided.

Secondlye, you must multiplie lykewaies the denominators of the seconde and thirde fractions in your sayd rule of three, the one by the other, and the of come, againe by the numerator of the first fraction, and the number which is produced of that multiplication, shall be your deuisor.

Thirdlye you muste deuide the aforesayd deuidende by the deuisor, and the quotient will be the aunswere to the questyon, as by Examples shall hereafter appeare.

But if you find whole numbers and fractions togither, in the sayd rule of three, you must first reduce the same in their fractions, by the 6 reduction.

Lykewyse if you finde anye of the

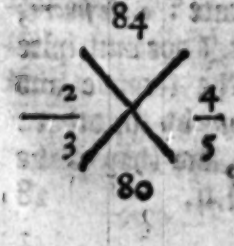
three

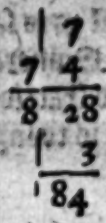
three numbers in your rule of three, to be whole numbers, alone without any fraction ioyned with it, you muste in this case put 1 vnder the same whole number, with a line betweene them both: The which 1 doth represent the denominator to the same whole number, and then you muste proceede to worke the rule of three in like maner, as though they were all fractions, as before is sayd.

The Examples of all three differences, aforesayd doe follow in the three next questions orderly.

If $\frac{3}{1} \times \frac{4}{7}$ $\frac{7}{1}$: I doe vnderstande thereby thus as followeth. If $\frac{3}{1}$ of any weight, or measure, be worth $\frac{4}{7}$ of twenty shillinges, or of any other sum, what are $\frac{7}{1}$ of the like weighte or measure worth after the rate? *Answere*, First as is sayd before, I doe multiplie the Numerators of the seconde and third fractions, the one by the other: that is to saye, 7 by 4, and they make

28: againe, I doe multiply the said 28 by the denominator of the fyrst fraction, that is to saye, by 3: and thereof commeth 84, the whiche 84 I set ouer the crosse for my deuidend. Secondly I doe multiplie the denominators of the second and thyrd fractions the one by the other, namelye 8 by 5, and they make 40, againe I doe multiplie ỹ said 40 by the numerator of the fyrst fraction: that is to saye by 2, and thereof commeth 80, the same 80 I doe set vnder the crosse for my deuisor, then I deuide 84 by 80, and there commeth in the quotient, 1 hi, and $\frac{4}{10}$ remayning, ỹ whiche $\frac{4}{10}$ beeing abreuied, maketh $\frac{2}{20}$ of a pounde, whiche is worthe 12 pence, and so muche will the aforesayde $\frac{2}{3}$ coste, as by the worke following doth appeare.





8	
5	8 4 (1 $\frac{4}{10}$.
40	8 0
2	
80	

6. If $\frac{2}{5}$ of an elle, of any marchandise doe cost me 12 shil. 7 d. the which 7 d. doth make $\frac{7}{12}$. what will $\frac{9}{10}$ of an Elle cost mee after the same rate? *Answere*, First I set downe my numbers, as followeth. If $\frac{2}{5}$ × 12 $\frac{7}{12}$. $\frac{9}{10}$. Then by the 6 reduction, I reduce 12 $\frac{7}{12}$ all into twelfthes, and they make $\frac{151}{12}$ for the seconde nūber in my rule of three, which must stand in the place of 12 $\frac{1}{12}$. And then will my 3 numbers stande thus as followeth $\frac{2}{5}$ × $\frac{151}{10}$ $\frac{9}{10}$. Then I multiplie 151 by 9, and the of come by 5, and thereof commeth 6795 the which I doe set ouer the crosse, for my deuidend. Likewise I multiplie 12 by 10, and the of come by 2, and therof commeth 240: which I doe sette vnder the crosse for my deuisor. Then I deuide 6795, by 240: and there commeth

in the quotient 28 shillinges: and 75 remayning, the which 75 because it is the remaine of shil. I do multiplie it by 12 penies, for that there is 12 penies into a shi. and therof cōmeth 900. The same 900 I deuide agayne by 240, and therof commeth 3 penies, and 180 remayning whiche 180 I doe set aparte ouer 240 with a line betweene them both, and they are $\frac{180}{240}$. The which being abreuied, doe make $\frac{1}{4}$ of a pennie, And thus I finde that the $\frac{9}{10}$ of an elle shall cost 28 s. 3 d. $\frac{1}{4}$, as hereafter doth appeare.

151	12		
7	12		
1212	24	2	
	127	5	
	151		

6795

151. / 12.

9 / 10

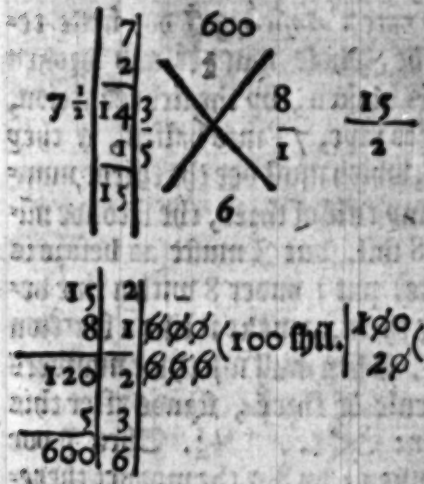
240

151	12	13	
9	10	287	
1359	120	6795	(28 shil.
5	2	2400	
6795	240	24	75

75 | 1
12 | 38
150 | 900 (30. 140/240.
75 | 240
900 | 1/4.

7. If 1/2 of an elle doe coſt mee 8 ſhillinges, what will 7 elles 1/2 coſt me after the rate? *Anſwere*, I doe firſte reduce the whole number and broken into his broken, by the firſt reduction, that is to ſaye, 7 1/2 into halfes, & they are 15/2, which muſt bee the thirde number in my rule of three, the ſeconde nũber is 8 ſhil. but I muſte (as before is taughte) put 1 vnder 8 with a line betweene them, to make it like a fraction thus, 8/1. Then muſt my three numbers in my rule of three, ſtande after this manner: 1/2 × 8/1. 15/2. Then I doe multiplye 15 by 8, & the product thereof by 5, amounteth 600: the whiche I doe ſet ouer the croſſe for my deuidend. Likewiſe I doe multiplie 2 by 1, and the product thereof by 3, and thereof commeth 5, the which I doe ſet vnder

the crosse for my deuisor. Then I deuide 600 by 6, and I finde in my quotient 100, the which is 100 shillings, I doe therefore deuide 100 by 20 shil. & my quotient is 5 li. And so muche will the 7 elles ½ cost me, as hereafter doeth appeare.



If 1 yarde of Ueluet cost 19 shillin. what shall ¼ of a yarde cost? *Answere:* sette downe your number thus. If 1 × 19 ¾. Then multiplie 1 times 19 by 3: and thereof commeth 57 for your

your deuidende, or number to be deuided. The whiche 57 you shall deuide by 1 tymes 1, 4 tymes, which are 4, & your quotient will bee 14 s. $\frac{1}{4}$, which $\frac{1}{4}$ is worth 3 d, so muche are the $\frac{1}{4}$ of a parde worth, after 19 shil. the parde, as by practise followeth.

	11	
3	87	(14 shil. $\frac{3}{4}$.
4	44	

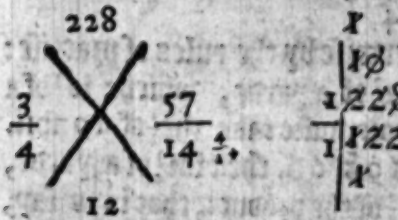
Or otherwise by the rules of practise: firste, for $\frac{3}{4}$ of a parde, whiche is $\frac{1}{2}$ of a parde, you muste take the $\frac{1}{2}$ of 19 shil. which is 9 s. 6 d. then for $\frac{1}{4}$ of a parde, take the $\frac{1}{2}$ of the product, that is to say, of 9 s. 6 d. and thereof commeth 4 s. 9 d. adde these numbers together, and you shall haue 14 s. 3 d. as aboue is sayde, and as appeareth here in the margent.

19 shil.		
9 shil.	6 d.	
4	9 d.	
14	3 d.	

9. If $\frac{1}{4}$ of a parde

of

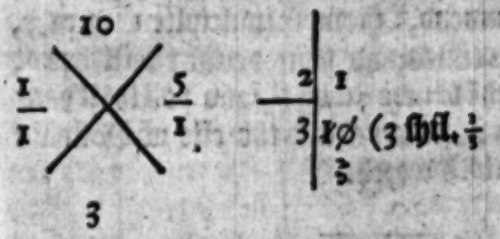
of Uelluet doe coste 14 shil. 3 d. what shall 1 yarde cost? *Answere:* Set your numbers downe thus: if $\frac{3}{4}$ × 14 $\frac{3}{4}$. $\frac{1}{1}$. Reduce 14 $\frac{3}{4}$ into a fraction, and they will be $\frac{57}{4}$, then multiplie 57 by 1, 4 tymes, and thereof commeth 228 for your deuidende. Likewyse multiplye 1 times 4, 3 times, and thereof commeth 12 for your deuisor, then deuyde 228 by 12, and your quotient will be 19 s, so much is the yarde of Uelluet worth.



Or otherwyse by the rule of practise, you shall take the $\frac{1}{4}$ part of 14 shilling 3 d. which is 4 s. 9 pence, and adde it with the same 14 shil. 3 d. and you shall haue 19 shil. as before.

14 *shil.*	3 *d.*
4	9 *d.*
19 *shil.*	0 *d.*

10. If one elle of Hollande cloth bee worth 5 s. what are $\frac{2}{3}$ worth after the rate? *Answere*: say thus, if $\frac{1}{1} \times \frac{1}{1}$. $\frac{2}{3}$ Then multiplie 2 time 5 one tyme, & therof commeth 10 for your deuidend, likewyse multiplie 3 times 1, one time they make 3 for your deuisor, then deuide 10 by 3, and therof commeth 3 s. $\frac{1}{3}$, which $\frac{1}{3}$ is worth 4 pence, & so muche are the $\frac{2}{3}$ of an elle worth.

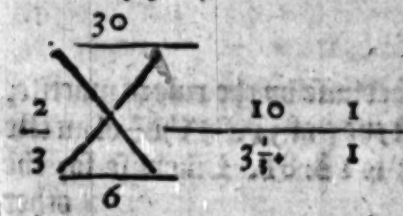


Or otherwise by the rule of practise, take first the $\frac{1}{3}$ of 5 s. for the $\frac{1}{3}$ of an elle and that is 1 s. 8 d. Likewise for the other

other $\frac{1}{4}$ of an elle, take agayne another $\frac{1}{4}$ of 5 s, whiche is also 1 shilling 8 d. and adde them togither, and so shall you haue 3 s. 4 d. as before.

5 *shil.*	
1	8
1	8
3 shil.	*4 d.*

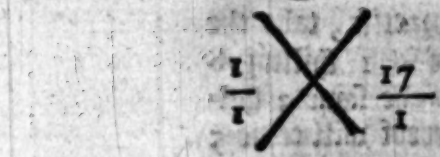
11. If $\frac{2}{3}$ of an elle of Hollande Cloth doe cost me 3 s. 4 d. what shall 1 elle coste? *Answere*, set downe your numbers thus, if $\frac{2}{3}$ × 3 $\frac{1}{3}$ $\frac{1}{1}$. Firste reduce 3 $\frac{1}{3}$ all into thyrdes, and it will be $\frac{10}{3}$ Thē multiplie 1 times 10, 3 times, and thereof commeth 30, for your deuidend, Likewyse multiplie 1 times 3, 2 times, and your deuisor will bee 6, thē deuide 30 by 6, and you shall haue 5 s. so muche is the elle of Hollande cloth worth.



Or otherwise by practise, take the $\frac{1}{4}$ of 3 s. 4 d. whiche is 1 shilling 8 pence, and adde it to the same 3 shillinges 4 d. and thereof will come 5 s. as before. For the $\frac{1}{4}$ of 3 s. is as much as the $\frac{1}{3}$ of 3 s. 4 d. whiche was the price that the $\frac{3}{4}$ of an elle did cost, as appeareth.

3 shil.	4 d.
1	8
5 shil.	0 d.

12. If one elle cost me 17 s. what shall 15 elles $\frac{1}{8}$ part coste? which $\frac{1}{8}$ is halfe a quarter of an elle. *Answere*, saye if $\frac{1}{1} \times \frac{17}{11}$. 15 $\frac{1}{8}$. First reduce 15 $\frac{1}{8}$ into eyght partes, and they make $\frac{121}{8}$ the multiply 121 by 17, 1 tyme, and therof commeth 2057, for your deuidende. Likewyse multiplie 8 times 1, 1 time, and the product will be 8, for your deuisor, then deuide 2057 by 8, and you shall finde 257 shil. $\frac{1}{8}$, which is 12 li. 17 s. 1 d. $\frac{1}{8}$, & so much are the 15 elles $\frac{1}{8}$ worth, as by practise doeth appeare in the page following.



Or otherwise, for 10 s. take the ½ of 15, which is 7 li. 10 s, the for 5 s. take the ½ of 7 li. 10 s. which is 3 li. 15 s. thirdly for 2 s. take the ⅕ of 7 li. 10 s. because ye ⅕ of 10 s. is 2 s. Fourthly for ye ⅕ of the elle, you shall take the ⅙ of 17 s. whiche is 2 shil. 1 d. ½. Then ad all these summes togither and youe shall finde 12 li. 17 s 1 d. ½: as before, and as appeareth more playnely in the former practise.

⅙	15.		
17	7.	10	0
	3.	15	0
	1. 1	10	0
		2	1½
	12 li. 17 sh.	1 d½	

13. If 25 elles be worth 2 li. 3 s. 4 d. what are 18 elles ½ worth by the price? *Answere:* First put 3 s. 4 d. into the part of a li, and you shall haue ⅓: then say, if 25/1 giue me 2 li. ⅓, what shall 18 ½ giue

$\frac{1}{4}$ giue: put the whole numbers into their broken, and then multiplye 1 tymes 13 by 75, the product will be 975, the which you shall deuide by 25 tymes 6,4 tymes, which maketh 600. Then diuide 975 by 600, and youre quotient will be 1 li. and 375 will remaine, the which 375 you shall multiply by 20, and thereof will come 7500 deuide the same by 600: your quotient will be 12 s. and 300 will remaine, the which abreuied is $\frac{1}{2}$ which is 6 pence, thus the 18 elles $\frac{1}{4}$ are worth 1 li. 12 s. 6 d. as by practise will appeare.

$$\frac{13}{2\frac{1}{2} \times 2\frac{1}{6}} \quad \frac{75}{18\frac{1}{4}}$$

Or otherwise by the rules of practise for because that 12 elles $\frac{1}{2}$ is the $\frac{1}{2}$ of 25 elles, therefore take the $\frac{1}{2}$ of 2 li. 3 s. 4 d. which is 1 li. 1 s. 8 d. the for 6 elles $\frac{1}{4}$ take the $\frac{1}{4}$ of 2 li. 3 s. 4 d. or else the $\frac{1}{4}$ of the laste produce (that is to saye, of 1 li. 1 s. 8 d.) which is all one, and adde them togither, so shall you haue 1 li. 12 s. 6 d. as before.

2

lib.	*shil.*	*d.*
2	3	4
1	1	8
	10	10
1 *lib.*	12 *shil.*	6 *d.*

14. If 15 yardes be worth 32 s. what are halfe a yarde and halfe a quarter, or elle $\frac{1}{8}$ of a yarde worthe? *Answere*, saye if $\frac{15}{1}$ giue $\frac{12}{1}$ what will $\frac{1}{8}$ giue? Multiplie 1 times 32 by 5, and deuyde the product by 15 times 8 times, and your quotient will be 1 : & $\frac{40}{120}$ remayning, which is $\frac{1}{3}$ of a shil. that is to saye 4 d. and so much are the $\frac{1}{8}$ of a yarde worth, that is to saye 1 s. 4 d.

$\frac{15}{1} \times \frac{12}{1}$ $\frac{1}{8}$.

Or otherwise, see what the yarde is worth after the maner aforesayd, in the other examples, and you shall fynde that the yarde is worth 2 s. 1 d. $\frac{1}{7}$: of the which number take firste the $\frac{1}{2}$ for $\frac{4}{8}$ whiche is 1 s. 0 d. $\frac{4}{7}$ of the whiche number, take the $\frac{1}{4}$ for the other $\frac{2}{8}$, which

which is 3 d. $\frac{2}{5}$, adde these two numbers together, and you shall finde the $\frac{8}{5}$ to be worth 1 s. 4 d. as before is sayd.

2 shill.	1 d.	$\frac{2}{5}$.
1.	0.	$\frac{4}{5}$.
	3.	$\frac{1}{5}$.
1 shil.	4 d.	0.

15. If 13 elles $\frac{5}{6}$ bee worth 27 shil. what are 10 elles $\frac{2}{3}$ worth by ye price? Answere: say if 13 $\frac{5}{6}$ giue $\frac{27}{1}$, what shall 10 $\frac{2}{3}$ giue, put the whole numbers into their broken, and you shall finde $\frac{13}{6}$, $\frac{27}{1}$, and $\frac{10}{3}$. Then multiply 6 times 27, by 32, and thereof cometh 5·84, the which number you shall diuide by 83 times 1,3 times, and you shall fynd 20 shil. $\frac{59}{83}$, which fraction is worth 8 d. $\frac{47}{83}$ partes of a penny.

83		32
13 $\frac{5}{6}$	$\frac{27}{1}$	10 $\frac{2}{3}$

16. If 2 yardes $\frac{1}{2}$ be worth 4 s. 8 d. what are 8 yardes $\frac{3}{4}$ worth? Aunswere

put the 8 d. into the part of a shilling, setting 8 ouer 12, so it will be $\frac{8}{12}$ which abbreuied, are $\frac{2}{3}$ then reduce the whole numbers into theire broken, and they wil stand thus $\frac{2}{1} \times \frac{14}{1}$, $\frac{33}{1}$, then multiply 2 times 14 by 33, and diuide the product by 5 times 3, 4 tymes: and you shall fynde 15 s. and $\frac{30}{60}$ will remayne, which are worth 4 d. $\frac{4}{5}$, so much are the 8 yardes $\frac{1}{4}$ worth.

$$\frac{5 \quad 14 \quad 33}{2\frac{1}{5} \times 4\frac{1}{4} \quad 8\frac{1}{4}}$$

19. If 1 kersey be worth 2 li 6 s. 8 d. howe manye kerseis shall I buy for 36 li. 3 s. 4 d. after the rate, Answere put 6 s. 8 d. into the parte of a li. and you shall haue 2 li. $\frac{1}{3}$, for the fyrst number in the rule of 3, and 1 kersey for the seconde number. Then put 3 s. 4 d. into the part of a li. and it is $\frac{1}{6}$, so you shall haue 36 li. $\frac{1}{6}$ for the third number, then will your 3 numbers in the rule of 3, stande thus. $2\frac{1}{3} \times \frac{1}{1}$. $36\frac{1}{6}$. Then reduce the whole numbers into theire bro-

bycken, & it will be thus, $\frac{7}{1}$ $\frac{1}{1}$ $\frac{217}{1}$ Then multiplye 3 tymes 1, by 217 and thereof will come 651 for your diuidende. Likewise multiply 7 tymes 1 by 6, and the product thereof will be 42. Then deuide 651 by 42, and you shall finde 15 $\frac{1}{2}$. So many kerseyes at 2 li. 6 s. 8 d. the peece, shall you haue for 36 li. 3 s. 4 d.

$$\frac{7}{2\frac{1}{2} \times \frac{1}{1}} \quad \frac{217}{39\frac{1}{2}}$$

The 4 chapter treateth of losses, and *gaynes in the trade of Marchaundise.*

1. IF 13 yardes $\frac{1}{2}$ bee worth 22 li. 10 s. how shall I sell 1 yarde to gayne $\frac{1}{3}$ d. to make of 3, 4, which is all one. Answere, say by the rule of three if 3 doe yeeld 4, what will 22 $\frac{1}{2}$ yeelde, multiply & diuide, and you shall find 30 li. Then say again by the rule of three, if 13 yardes $\frac{1}{2}$ doe giue 30 li. as well of principall as of gayne: what wyll

1 yarde be worth by the price ? Multiply and diuide, and you shall finde 2 li. 5 s. & for that price must the yarde be solde to gayne the $\frac{1}{3}$, or to make of 3, 4.

1 lo 180

$\frac{3}{1} \times \frac{4}{1}$

6

45 | 180 (30

$22\frac{1}{2}$ | 60

90

40

$13\frac{1}{3} \times \frac{10}{1}$ $\frac{3}{2}$

40

Or otherwise, take the $\frac{1}{3}$ part of 12 li. 10 s. which is 7 li. 10 s: that shall you adde with 22 li. 10 s. and you shal haue 30 li, as before. Then diuide 30 by $13\frac{1}{3}$, and you shall fynde 2 li, 5 s, as aboue is sayd.

li.	shi.
22	10
7	10
30	00

2. If one yarde bee worth 27 s, 6 d.

for

for how much shall 16 yardes ¾ be solde to gayne 2 s vpon the pounde of money ? that is to say vpon 20 s? Answere, add 2 s. vnto 20, and you shall haue 22, then say, if 20 s principall, doe giue 22 s principall, and gayne: how muche will 27 s. 6 d. principall yeelde? Multiplye and diuide, and you shall finde 30 s ½, then say againe by the rule of three If 1 yarde doe giue me 30 s. ½ (whiche is as well the principall as the gayne) what shall 16 yardes ¾ giue me? Multiplie and diuide, and you shall finde 25 li 4 s. 2 d. For the same price shall the 16 yardes ¾ be solde to gayne after the rate of 2 s. vpon the pounde of Money, or vpon 20 s. which is all one.

20/1 × 22/1	55 / 27 ½	121 / 1/1 × 30 ½	50 / 16 ¾

3. If 10 yardes ¾ be worth 25 li. 10 s. for howe muche shall 2 yardes ¼ be solde, to gaine after 10 li. vpon the 100 li. of money? Answere, say if 100 principall yeelde 110, as well principall as

gayne, how muche will 25 li. 10 shil. yeelde me? multiply and diuide, and you shall fynde 28 li. 1 s. Then saye if 10 yards $\frac{1}{4}$ doe yeelde me 28 li. 1 s. as well principall as gayne, how much shall 2 $\frac{1}{4}$ yeelde me? Multiply and diuide, and you shall finde 5 li. 18 s. 4 d. $\frac{4}{11}$, and for so much shall the 2 yards $\frac{1}{4}$ be solde, to gayne after 10 li. vppon the 100 li. of money.

$$\frac{100}{1} \times \frac{110}{1} \qquad \frac{55}{25\frac{1}{2}}$$

$$\frac{22}{10} \times \frac{561}{28\frac{1}{20}} \qquad \frac{9}{2\frac{1}{4}}$$

And although that in these questions of gayne and losse, sometymes the first number is not lyke vnto the thyrd number, that is to saye, of the same denomination, for whereas one woulde saye, if 20 s. gayne 2 s. what shall 50 li. gayne? or what shall 25 li gayne. &c. Or if 20 li. doe gayne 2 li. what shall 25 shil. gayne? or what shall 27 shil. $\frac{1}{2}$

gayne

gayne? Yet the same doth not proue that the rule is therefore false, For if 20 s. doe gaine 2 s. 20 li. shall gayn 2 li & 30 d. shall gaine 2 d. likewise 20 Crownes shall gayne 2 Crownes: and so of all other. Therefore it is to be vnderstoode that the firste number of the rule of three in these reasons is purposed to bee semblable or like to the third in qualitie or name.

When one Marchant selleth wares to another, and he giueth to the buyer 2 vpon 15: how muche shall the buyer gayne vppon the 100 after the rate? *Answere*, first adde 2 vnto 15, and they are 17, then say. if 15 giue 17, what shall 100 giue, multiplye and diuide, and you shall finde 113 $\frac{1}{3}$ so the buyer getteth after the rate of 13 $\frac{1}{3}$ vpon the 100.

15. | 17. | 100.

4. If one northren Dosen cost me 3 li. 5 s. I sell the same agayn for 3 li. 12 s 6 d. howe much doe I gayn vpon the pounde of money after the rate? *Anſ.*

say if 3 li. $\frac{1}{4}$ doe giue 3 li. $\frac{5}{6}$, what shall $\frac{20}{13}$ giue, put ye whole nūber into their broken, and you shal haue $\frac{13}{4}$ × $\frac{29}{8}$ $\frac{20}{1}$ then multiply 4 times 29 by 20, and thereof commeth 2320: for your number that is to be deuided, likewise multiply 13 times 8, 1 time, and thereof commeth 104. Then diuide 2320, by 104, and you shall fynd 22 shil. $\frac{4}{13}$. So I shall get 2 s. $\frac{4}{13}$ vpon 20 s, or vppon the pound of money.

$$\frac{13}{3\frac{1}{4}} \times \frac{29}{3\frac{5}{8}} \quad \frac{20}{1}$$

5. If a yarde of cloth cost me 7 s. 8 d. and afterward I sell of the same cloth 13 yardes $\frac{1}{4}$ for 4 li. 13 s. 4 d. I would know whether I do winne or lose, and how much vppon the 100 li. of money? Answere: See first at 7 s. 8 d. the yard what the 13 yardes $\frac{1}{4}$ shall coste, and you shall finde 5 li. 1 s. 7 d. And I sold the same but for 4 li. 13 s. 4 d. so that I do lose vpon the 13 yards $\frac{1}{4}$, the sūme of 8 s. 3 d. Then if you wil know howe

muche

muche is lost in the 100, saye by the rule of 3, if 5 li. 1 s. 7 d. doe lose 8 s. 3 d. What wil 100 li lose? Firste put 1 s. 7 d. into the part of a li. and it will be $\frac{19}{240}$. Likewise put 8 s. 3 d. into the part of a li. & it is $\frac{13}{80}$. Then will youre nūbers stand thus: $5\frac{19}{240} \times \frac{13}{80} \quad \frac{100}{1}$ reduce the whole into his broken, and then multiply and diuide, so you shall find 8 li. $\frac{1184}{9712}$, which fractiō is worth 2 shil. 5 d. $\frac{169}{1217}$, and so muche is losse, in the 100 li. of Money.

1219.

$5\frac{19}{240} \times \frac{13}{80} \quad \frac{100}{1}$

6. More, if 12 yardes $\frac{1}{2}$ of scarlet be solde for 30 li. 15 s. vppon the whiche is gayned after the rate of 11 $\frac{1}{2}$ vppon the 100, I demaunde what the yarde did cost at the first: Answere: from 30 li. 15 s. subtracte his $\frac{1}{20}$ part which is 3 li. 1 s. 6 d. and there resteth 27 li. 13 s. 6 d. the whiche number multiplyed by 2, bringeth 55 li. 7 s. of the whiche number take the $\frac{1}{12}$, which is 11 li. 1 s.

and

and 4 d. ꝙ $\frac{2}{3}$. Then take agayne the $\frac{1}{5}$ of the ſayd 11 pounde, 1 ſhilling 4 d. $\frac{4}{5}$, which is 2 li. 4 ſhillings three pence $\frac{2}{5}$. And ſo much did the yarde coſt, at the fyrſte penie.

30. lib.	15. ſhil.	0 d.
3	1	6
27	13	6
2	0	0
55	7	0
11	1	4 $\frac{4}{5}$
2. lib.	4 ſh l.	3 d. $\frac{2}{5}$.

7. More, If 15 yardes $\frac{1}{4}$ of Scarlet, doe coſt me 32 li. 13 s. 4 d. And I ſell the yarde againe for 2 li. whether doe I winne or loſe, or how much in, or vpon the pound of money.

Anſwere, looke what the 15 yardes $\frac{1}{4}$ are worth at 2 li. the yarde, and you ſhall finde that they are worth 31 poũd 10 s. But they did coſt 32 li. 13 s. 4 d, ſo that there is loſte vppon the whole, 1 li. 3 s. 4 d. Then to knowe howe much

much is lost in the pound, say by ȳ rule of three, if 32 li. ½ doe lose 1 li. ¼, what wil ½ lose, that is to saye, what will 1 li. lose: reduce the whole numbers into their broken, then multiplye 1, and diuide, so shall you finde $\frac{1}{21}$ parte of a li. Then multiply 21, by 240 d. because so many pence are in a pound, and diuide the product by 588, and you shal finde 8 d. $\frac{168}{588}$, whiche being abbreuiated doe make ⅞, and thus you see that 8 d. ⅞ is lost in the li. of money.

$$\frac{98}{32\frac{1}{2} \times 1\frac{1}{4}} \quad \frac{7}{\frac{1}{2}}$$

8. If 1 yarde of clothe of Tissue bee solde for 3 li. 15 s. whereupon is losse after the rate of 10 s. in the 100 I demaunde what 12 yardes ½ of the same tissue did cost: Answere, adde vnto 3 li. 15 s, his owne $\frac{1}{10}$ parte, whiche is 7 s. 6 d. and all amounteth to 4 li. 2 s. 6 d. then looke what the 12 yardes ½ will amount vnto after 4 li. 2 s. 6 d. and you shall fynde that they wil come

to

to 31 li. 11 s. 3 d. so much did the 12 yards ½ cost.

12 ½	
3 li. 15 shi. 0 d.	4 li. 2 shi. 6 d.
7 6.	48 00 0
4 li. 2 shi. 6 d.	1 10 0
	2 10 3
	31 li. 11 shil. 3 d.

9. Item, If I set one Millshire white for 6 li. 12 s. whereupon I doe gayne after the rate of 2 s vppon the li. of money: that is to say, vpon 20 s, I demaunde what 11 peeces of the same whites did cost me. Answere, from 6 li. 12. (whiche is 132 s) you shall subtract his ½ part, that is to saye 12 s, and there will remayne 120 s, or 6 li. Then see at 6 li. the cloth, what the 11 clothes are worth, and you shall finde that they are worth 66 li. And so much did the 11 clothes cost.

132 shil.	11
12 shil.	6
120 shil.	66 li.

10.

10: If I sell 10 elles $\frac{1}{2}$ of Hollande for 22 s. 6 d. wherevpon I doe loose after the rate of 2 s in the li of money. I demaunde what the elle did cost mee? Answere, say by the rule of three, if 18 giue 20 s. what will 22 s 6 d. giue? Multiplye and diuide, and you shall finde 25 s. Then diuide 25 s, by 10 $\frac{1}{2}$: and thereof commeth 2 s. 4 d. $\frac{4}{7}$. So much did the elle cost.

$\frac{18}{1} \times \frac{20}{1}$ 22 $\frac{1}{2}$.

11. If I sell one cloth for 5 li. wherevpon I doe loose after 10 in the 100 I demaunde howe muche I shoulde loose or gayne in the 100, if in case I had solde the same for 5 li. 10 shi. Answere, say if 90 yeeld 100, how muche will 5 li giue? Multiplie & diuide & you shal finde 5 li. $\frac{1}{3}$. Then say agayne, by ye rule of three, if 5 $\frac{5}{9}$, come to 5 $\frac{1}{3}$, what will 100 come to? Multiply & diuide, & you shall finde 99 li, whiche being subtracted from 100, there will remayne 1 li. and so much lost in the 100

The

¶ The 5 Chapter treateth of lengthes and bredthes of Tapiſtrie, & other clothes.

1. If a peece of Tapiſtrie be 5 elles $\frac{1}{4}$ long, and 4 elles $\frac{1}{2}$ in bredth, how many elles ſquare doeth the ſame peece contayne. Anſwere: Multiplye the length by the bredth, that is to ſay $5\frac{1}{4}$, by $4\frac{2}{3}$, and thereof will come 26 elles $\frac{1}{12}$. So manye elles ſquare doeth the ſame peece contayne.

2. Moze if a peece of Tapiſtrie do contayne 32 elles ſquare 3 and the ſame being in length 6 elles $\frac{1}{2}$, I demaunde howe manye elles in bredth the ſame peece doth contayne: Anſwere, diuide 32 elles by $6\frac{1}{2}$ and thereof commeth $5\frac{1}{13}$. So manye elles doeth the ſame peece contayne in bredth.

3. Moze, a peece of cloth being 25 yardes $\frac{1}{2}$ in length, and 7 quarters $\frac{1}{2}$ a quarter in bredth, howe many yardes of $\frac{1}{2}$ of $\frac{1}{2}$ of one thirde howe, will the ſame

same peece make? Answere, see firste by the 5 reduction what part of a yarde the ¼ and ½ quarter bee, and you shall finde that they make ¾, whiche is 1 yarde ¾. Then multiply 13 yardes ¾ by 1 yarde ¾, & you shal haue 18 yards, ⅝ in square, the which you must diuide by ¾ and ½ being reduced into a fraction by the fifte reduction: that is to say, by ½ (because that ¾. ½, being brought into one fraction, maketh ½) and you shall finde 22 yardes. So manye yardes of ¾ and ½ broade doeth the same peece containe.

4. Note, a marchant hath bought 4 yardes ¾ of cloth, beeing fiue quarters and a halfe one quarter broade, to make him a gowne, the whiche hee will lyne throwe out with blacke Say of ¼ of a yarde broade. I demaunde howe muche Say he must buy. Answere, Multiply the length of the cloth, by the breadth, that is to say 4 ¾, by 1 ¼, (which is the fiue quarters, ¼ a quarter) and thereof commeth 7 yardes, ⅞, the whiche ye-

uide

vide by ¼, and you shall find 10 yards, ½. So many yardes of Say make hee haue to line the same 4 yardes ½ of cloth, being of 6 quarters & ½ a quarter byrde.

5. Item, at 6 s. 8 d. the elle square what shalbe peece of Tapistrie cost me whiche is 7 elles ½ long, and 4 elles ¼ byrade? Answere: multiply 7 ½ by 4 ¼, & there of commeth 23 elles, ½ square then say by the rule of three, if one elle square cost me 6 s. 8 d. what shall 23 ½ elles cost, multiply and diuide, & you shall finde 7 li. 15 s. 10 d. so much the sayd peece of Tapistrie did cost.

6. Or otherwise by the rule of practise take the ⅓ of 23 ½: and you shall fynde 7 li. 15 s. 10 d. as aboue is sayde.

7. Item, a peece of Hollande cloth conteyning 42 elles ½ Flemishe, how many elles Englishe doe they make? Heere you muste fyll note, that 100 elles Flemishe doe make but 60 elles Englishe, and so consequently, fyue elles Flemishe, doe make but 3 elles

Englishe,

English. Therefore say by the rule of three, if 5 elles flemish do make 3 elles English, how many elles English will 42 elles ½ flemishe make? Multiplye and diuide, and you shall fynde 25 elles ½ English, and so manye elles English doth 42 elles ½ Flemishe conteyne: the like is to be done of all other.

Item, I haue boughte a peece of Tapistrie, being 5 elles ½ long, and 4 elles ½ broade of Flaunders measure, I demaunde howe manye elles square it maketh English measure? Answere: First fynd as muche as 3 elles English, are worth 5 elles Flemishe, therefore put 3 elles English into his square, in multiplying 3 by it self, whiche maketh 9: likewise multiplye 5, in it selfe squarely, and it will be 25. Then multiplye 5 ½, which is the length of the peece, by 4 ½, whiche is ½ breath thereof, commeth 26 elles ½ square: then say by the rule of three, if 25 elles square of Flemishe measure bee worth

9 elles square of Englishe measure; what are 26 elles $\frac{3}{8}$ Flemishe worthe? multiplie and diuide, & you shall fynde that they are worth 9 elles $\frac{31}{50}$ square of Englishe measure.

8. More, at 3 s. 6 d. the elle Flemish what is the Englishe elle worth after the rate? Aunswere: first, say if 5 elles Flemishe be worth 3 elles Englishe, what is 1 elle Flemish worth? multiply and diuide, and you shall finde $\frac{1}{5}$ of an Englishe elle. Then say agayne by the rule of three, if $\frac{1}{5}$ of an Englishe elle, be worth 3 s. 6 d. what is 1 Englishe elle worth? multiplie and diuide and you shall fynde 5 s. 10 d. so muche shall the english elle be worth.

9. More, at 6 s. 8 d. the Flemish elle square, what is ye english elle worth? Aunswere, say by the forefayde reason, if 25 elles flemishe square, be worth 9 elles square Englishe; what is 1 elle square Flemishe worth? multiplie and diuide, & you shall finde $\frac{9}{25}$ of a square

Englishe elle. Then saye, if $\frac{9}{25}$ of an English elle be worth 6 s, 8 d, what is 1 square elle of English worth? multiply & diuide, and you shall finde 18 s, 6 d, $\frac{1}{3}$: so much shall one Englishe elle square be worth.

The sixte chapter treateth of the reducing of the Pawnes of Genes into Englishe yardes.

Note that 100 pawns do make 26 yardes and 1 pawne is $\frac{13}{50}$ of a yard after the same rate, and 3 pawnes $\frac{1}{2}$ do make 1 yard.

Example.

I Haue boughte 97 pawnes $\frac{1}{2}$ of Genes veluet, & I would know how many yardes they will make? Aunswere: say by the rule of three, if 100 pawnes doe make 26 yards, what will 97 $\frac{1}{2}$ make, multiplye and diuyde, and you shall haue 25 yardes, $\frac{57}{100}$. So many yardes do the 97 pawnes $\frac{1}{2}$ conteyne.

Or otherwise, take some other num-

ber at your pleasure, as 25 pawnes, which doe make 6 yardes $\frac{1}{2}$, and then say by the rule of three, if 25 pawnes doe make 6 yardes $\frac{1}{2}$, what will 97 $\frac{1}{2}$ pawnes make? Multiplye and diuyde, and you shall fynde 25 yardes $\frac{7}{25}$, as before.

More, at 2 shillinges 7 d. the pawn of Genes, what will the English yard be worth after the rate? Aunswere say by the rule of three, if $\frac{13}{50}$ of an English yard be worth 2 shillinges $\frac{7}{12}$. What is $\frac{1}{1}$ yarde worth, multiply and diuide, and you shall fynde 9 s. 11 d. $\frac{3}{13}$, So much is the English yarde worth.

Or otherwise multiplye 100 pawnes which is 26 yardes by 2 s. 7 d. & thereof cometh 258 s. 4 d. ẏ which you must diuide by 26 yardes, and you shal find 9 s. 11 d. $\frac{3}{13}$, as before.

If 257 pawnes $\frac{1}{2}$ be worth 20 li. 16 s. 8 d. what is one yarde worth after the rate? Answere, say by the rule of three, if 257 $\frac{1}{2}$ pawnes, bee worth 20 $\frac{1}{1}$, what are 3 pawnes $\frac{11}{13}$ worthe?

Multi-

Multiplie and diuide, and you shall finde $\frac{29}{117}$ parte of a pounde whiche is worth 6 s. 2 d. $\frac{1}{117}$, and so muche is one yarde worth.

The vii. chapter treteth of Merchandise solde by waight.

1. AT 9 d. ½ the ounce, what is the li. weight worth? Answere, say if ½ giue 9 ½, what will 1 giue? Multiplie and diuide, and you shall haue 12 s. 8 d. so much is the yarde worth?

Or otherwise by the rules of practise, for 6 pence, take the ½ of 16: which is 8 s. then for three d. take the ¼ of 16 s. which is 4 s. Finally, for the halfepenye, take 16 pd. which are 8 d. then adde all these numbers togither, and you shall finde 12 s. 8 d. as before.

2. More, at 10 d. ½ the ounce, what are 112 li. weight worth after the rate? *Answere*, reduce 112 li. into ounces, in multipl. ag 112 li. by 16 ounces, & you shall haue 1792 ounces, then say

by the rule of three, if [illegible] 10 ½ [illegible] Multiplie and deuide, & you shall finde 188 10 d. whiche doe make 78 li. 8 s. and so much are the 112 pounde worth after 10 d ½ the ounce.

4. At 12 s. 8 d. the li. waight, what is the ounce worth, Aunswere: Put 12 s. 8 d. into pence, and you shall haue 152 pence, then say by the rule of three if 16 ounces cost 152 pence, what shall 1 ounce cost, multiplye and diuide, and you shall finde 9 d. ½, so muche is the ounce worth.

Or otherwise, take the ¼ of 12 s. 8 d. for 4 ounces, and thereof commeth 3 s. 2 d. then for one ounce take the ¼ of 3 s. 2 d. and you shall haue 9 d. ½, as before.

5 At 32 li. 10 s. the quintall that is to say, the 100 li. waight: what is 1 li. waighte worth after the same rate? Answere: put 32 li. 10 s. all into shil. and you shall haue 650 s.

Then say by the rule of three, if 100

giue

giue 650, what will 1 giue, multiply and diuide, and you shall finde, 6 s. 6 d. so much is the pound worth.

6. If one pounde waight of Saffron doe cost me 18 s. 3 d. what shall 355 li 10 ounces, cost me by the same price? Answere, say by the rule of three, If $\frac{1}{1} \times 18\frac{3}{4}$ 355 $\frac{1}{2}$. Multiplye and diuide, and you shall finde 331 li. 18 s. 4 d. so much are the 355 li. 10 ounces worth.

Breefe Rules of Waight.

WHo that multiplieth 5 li. that 1 li. waight is worth by 5, and diuideth the product thereof by 112, he shall finde how many pounds in money the quintall is worth, that is to saye, howe muche the 100 pounde waight is worth.

And contrariwise he that multiplyeth the pounds of money that the 100 li. waight is worth by 112, and dyuy-

peth the product by 5 shall finde howe manye pence the pounde waighte is worth.

Example.

At 17 pence the pounde waight, what is the 100 pounde waighte worth? Answere, multiply 17 by 5 and therof commeth 85, diuide the same by 12, and you shall fynde 7 pound $\frac{1}{12}$ in money, which $\frac{1}{12}$ is worth one shilling & eight pence. So muche is the 100 li. waight worth.

Moze, at 13 li. the 100 li. waighte what is one pounde waighte worthe? Answere, Multiplie 13 by 12, & thereof commeth 156, the which diuide by 5, and you shall fynde 31 li. $\frac{1}{5}$ whiche $\frac{1}{5}$ is 2 s. 7 li. $\frac{1}{5}$ and so much is one pounde waight worth.

The like is to be done of yardes, elles, or of any other measure, when wee reken but fyue score to the hundred.

Breefe Rules for Measure.

Who that multiplyeth the pence, the one

one elle is worth by 2. And deuideth the product by 4, hee shall finde howe many poundes in money the 120 elles are worth, which 120 elles we counte but for a C, in this place, because of worke, which measure is vsed for Canuas only.

Or otherwise, if you deuide the pennies, that one elle is worth, by 2: you shall haue in your quotient the pounds that the sayd 120 elles are worth, and if any thing remayne, they are parts of a pound.

And contrariwise, he that multiplieth the poundes in money that the 120 elles are worth, by 4, and diuideth the diuome by 2, shall fynde how manye pence the elle is worth.

Or otherwise if you multiplye the poundes that 120 elles are worth, by 2, you shall finde in the product howe many pennies one elle is worth.

Example.

At ten pence the elle, what are 120 elles worth? Answere, multiply 10 d.

by

by 2, and thereof commeth 20. The which diuide by 4, and you shall fynde 5 pound, so manye poundes in moneye are 120 elles worth, at 10 d. the elle.

Or otherwise diuyde 10 pennies by 2, and thereof commeth into your quotiente 5, whiche 5 doth represent 5 li. and so many poundes are the 120 elles worth, as before.

More, at 9 pounde the 120 elles, what is one elle worth? Answere: multiplie 9 pound by 4, and thereof commeth 36. the whiche diuide by 2, and you shall fynde 18 d. so muche is one elle worth.

Or otherwise, if you multiplye 9 poundes whiche is the price that the 120 elles are worth, by 2, you shall haue in the product 18, whiche 18 doth signifie the penies that 1 elle is worth, when the 120 elles doth cost 9 pounde as before.

The like is to be done of all manner of wares, whiche are solde after 120, for the hundred.

Breefe

Breefe rules for our hundred weight here at London, which is after 112 li. for the 100.

He that multiplyeth y peuce that one pound weight is worth, by 7 and diuideth the producte by 15, shall finde how many pounds in money the the 112 pound is worth.

And contrariwise he that multiplyeth the pounds in money, that 112 li. is worth, by 15, and diuideth the product by 7, shall finde how manye pence one pound waighe is worth.

Example.

As 9 pence the pound waighe, what is the 112 li. waighe worth? Answere: Multiplie 9 d. by 7, and thereof commeth 63: the which diuide by 15, and you shall finde 4 li. $\frac{3}{15}$ whiche beeing abbreuiated is $\frac{1}{5}$ of a pounde, beeinge worth 4 shil. And thus the 112 li. is worth 4 poundes, 4 shillinges: after the rate of 9 d. the pound.

At

At 8 li. the 112 li. weight, what is 1 li. weight worth. Answere. Multiply 8 li. by 15, and therof cometh 120, the which deuide by 7, and you shall finde 17 d $\frac{1}{7}$, so much is 1 li. weight worth, when the 112 pound is worth 8 pounds.

The eyght chapter treateth of Tares *and allowances of Marchandise solde by weight.*

1. AT 12 pounde the 100 suttell, what shall 987 pounde suttell be worth? In giuing 4 li. weight vppon euerye 100 for tret? Answere adde 4 pound vnto 100, and you shall haue 104. Then saye by the rule of three, if 104 be worth 12 li. what are 987 pound waight worth? multiplye and deuide, and you shall fynde 113 li $\frac{11}{13}$, which is worth 17 s. 8 d. $\frac{4}{13}$. So muche shall the 987 pounde weight be worth.

104 | 12 | 987.

2.

4. At 6 s 8 d the pound waight, what shall 345 li. ½ be worth in giuing 4 li. waight vpon euery 100, say the Tret Answere. See firste by the rule of 3 what the 100 pound is worth, saying if $\frac{1}{3}$ [illegible] $6\frac{2}{3}$ [illegible]. Multiplye and diuide and you shall fynde 33 li. $\frac{1}{3}$, then rebate 4 li. vnto 100, and they are 104, then say againe by the rule of three, if 104 li. be solde for 33 li. $\frac{1}{3}$, for howe much shall 345 li. ½ be solde? Multiply and diuide, and you shall finde 110 li. 14 s. 8 d. $\frac{1}{3}$. For so much shall the 345 li. ½ be solde, at 6 s 8 d the pounde, in giuing 4 vpon the 100.

5. Here, if 100 li. be worth 36 s 8 d. what shal 780 li. be worth, in rebating 4 li vpon euery 100, for Tare & cloffe And. Multiplie 780 by 4, and thereof commeth 31 li. The which diuide by 100, and you shall haue 3 li. $\frac{1}{25}$: abate 31 $\frac{1}{25}$ from 780, and there will remaine 748 $\frac{4}{25}$. Then say by the rule of three, if $\frac{100}{1}$ do cost 36 $\frac{2}{3}$, what will 748 $\frac{4}{25}$ coste after the rate? Multiply and deuide, so

shall

shall you find 274 li. 6 li. [illegible], & so much shall the 780 li. cost [illegible] in rebating 4 li. vpon euerye 100 for Tare and Cloffe.

4. More, whether doth he lose more, that giueth 5 li. vppon the 100, or hee that rebateth 5 li. in the 100 for Tare and cloffe? Answere: Firste note that he which giueth 5 li. vppon the 100 giueth 105 for 100, and he whiche rebateth 5 li. in the 100, giueth the 100 for 95. Therefore saye by the rule of three, if 105 be giuen for 100 for how muche shall the 100 bee giuen? Multiply and diuide, and you shall fynde 95, $\frac{5}{21}$, and hee whiche rebateth 5 in the 100 maketh but 95 of 100, so that hee looseth 5 in the 100, and the other which giueth 5 vppon the 100, loseth but 4, $\frac{16}{21}$ vppon the 100. Thus you maye see that hee which rebateth 5 in the 100, loseth more by $\frac{5}{21}$ in the 100, then the other which gaue 5 vppon the 100 for Tare and cloffe.

5. If 100 pound of Allam do cost men,

26 s. 8 d. how shall I sel the li. waight to gaine after the rate of 10 vppon the 100? Answere: put 26 s. 8 d. all into pence, and you shall haue 320 d. Then say by the rule of three, if a 100 giue a 110, what shall 320 giue. Multiplye 320 by 110, and diuide the product by a 100, and you shall fynde 152 d. Then say againe, if 100 li. be worth 352 d. what is 1 li. worth? multiply and diuide, and you shal haue 3 d. $\frac{5}{6}$, which $\frac{26}{50}$, is worth $\frac{1}{2}$, and $\frac{1}{25}$ of $\frac{1}{2}$. That is to say, ye pound waight shall be worth 3 d. $\frac{1}{2}$, $\frac{1}{25}$ of a halfepenie for gayning 10 vpon the 100.

6. If one pound waight doe rosse mee 6 s. 10 d. and I sell the same for 7 s. 2 d. I demaunde how much I shall gaine vppon the 100 li. of money after the rate? Answere. say by the rule of 3, if 6 $\frac{5}{6}$ yeelde 7 $\frac{1}{6}$ what will $\frac{100}{1}$ yeelde. Put their whole nsibers into their broken, then multiply and diuide, and you shall fynd 104 $\frac{1}{6}$, from the whiche subtract 100, and there resteth 4 li. $\frac{5}{6}$ so much

much is gayned vpon the 100 pounde of money after the rate.

7. Poyze, if one pounde doe coſte me 5 ſ. 4 d. and I ſell the ſame agayn for 4 ſ. 9 d. I demaunde howe muche I ſhall looſe vpon the 100 pounde of money? Anſwere: ſay, if 5 1/2 doe giue but 4 1/2, what ſhall 100/1 giue, put the whole number into the ir broken. Then multiplye and diuide, and you ſhall fynde 89 1/11, the whiche you muſt ſubtracte from 100, and there will remayne 10 li. 10/11, ſo much is loſt vpon the 100 li. of money.

8. Poyze, if the li. waighe doe coſte me 3 ſ. 2 d. and I ſell it agayne for 4 ſ. 4 d how much ſhall I gayne vpon 20 ſhil. Anſ. ſay if 3 1/2 giue 4 1/2, what ſhall 20/1 giue: Multiplye and diuide, and you ſhall fynde 17 ſ. 7/9, from the which abate 20 ſ. and there will remayne 7 ſ. 7/9 which is 4 d. 8/9, ſo muche is gayned vpon the pound of money, that is to ſay vpon 20 ſ.

9. If the pounde waighte doe coſt mee 4 s. 4 d. and I ſell it againe for 3 s. 2 d. I demaunde howe muche I ſhall looſe in the pound of money, that is to ſaye, in twenty ſhillinges? Anſwere ſay if 4 $\frac{2}{3}$ giue but 3 $\frac{1}{2}$, what will $\frac{10}{1}$ giue: multiply and diuide. and you ſhall fynde 14 s. $\frac{1}{11}$, the whiche you muſt abate from 20 s. and there will remayne 5 ſhil. $\frac{1}{11}$ which $\frac{1}{11}$ is worth 4 d. $\frac{9}{11}$ of a pennie, and ſo muche is loſt vpon the pounde of money.

The ix chapter treateth of certaine queſtions, done by the double rule, and alſo by the rule of three compoſed.

10. A Marchant hath ſolde wynes for the ſume of 300 pounndes, and he hath gayned therein, after 10 li. vpon the 100 li. The queſtion is to knowe, howe muche he gained in all? Anſwere, ſay by the rule of three, if a 110 li. doe gaine 10 li. what will 300 li. gaine: multiply and diuide, and you

shall finde 27 li. $\frac{1}{11}$, and so much hath he gayned in all.

11. A Marchant hath bought a peece of Hamshire kersey, contayning 18 yards, for the price of 4 li. 10 shil. The question is to knowe, howe manye yardes he shall sell for 33 shil. 4 d. to gayne 20 s. in the whole peece? *Ans.* adde 20 shil. vnto 4 li. 10 s, and they make 5 li. 10 s. The say by the rule of three, if 5 pound $\frac{1}{2}$ do yeeld me 18 yards what will 1 li. $\frac{2}{3}$ yeelde: multiply and diuide, and you shall finde 5 yardes $\frac{4}{11}$. And so many yardes shall hee sell to gayne 20 s. in the whole peece.

12. A Marchant hath sold Sugars for the summe of 600 li. ready money and he hath gayned in the whole, the summe of 60 li. The question is to knowe, howe muche he hath gayned vppon the 100 li. *Answere*, firste you must subtracte 60 li from 600 li. and there will remayne 540 li. Then say by the rule of three, if 540 li. do gayne

60

90 li what will 100 li. gayne? multiply and diuide, and you ſhall finde 11 li $\frac{1}{7}$ and ſo muche hathe he gayned vpon the 100 li.

13. Item, if 1 li. weighe of Maces doo coſt me 5 ſ. 10 d. and afterwarde I doo ſell the ſame for 6 ſ. the li to be payd for it at the ende of 3 monthes: I demaunde howe muche I ſhall gaine vpon 100 li in 12 monthes after the rate? *Anſwere*: Say by the firſt parte of the rule of three compoſed: if 5 ſ. $\frac{1}{7}$ in $\frac{1}{4}$ monthes do gayne $\frac{1}{7}$ of a ſhilling. which is 2 d. what will $\frac{100}{1}$ li. gayne in $\frac{12}{1}$ monthes? multiply and diuide. and you ſhall finde 11 li. $\frac{1}{7}$. and ſo much ſhal I gaine in 12 monthes, after the rate.

14. Item, if 1 peece of kerſey do coſt me 36 ſ. for what price may I ſell the ſame to be payde for it at the ende of 3 monthes, ſo that I may gaine therby after the rate of 10 li. vppon 100 li. in 12 monthes? *Anſwere*: ſay by the

firſt parte of the rule of three compoſed, if 100 pounde in 12 monthes, doe gayne 10 pound, what will 36 ſ. gaine in 3 months: multiplie and diuide, and you ſhall finde $\frac{1010}{1200}$ of a ſhilling, the which being abreuied doth make $\frac{9}{10}$ of a ſhilling which is worth 10 pence $\frac{4}{10}$ the ſame you muſt adde with 36 ſ, and then you ſhall haue 36 ſhil. 10 pence $\frac{4}{10}$. And for that price I muſt ſell the peece of kerſey for to gaine therein 10 li. vpon the 100 pound in 12 monthes, and giuing three monthes time for the paiment.

15. More, if 6 yardes of Northren kerſey doe coſt me 8 ſhil. and I ſell 4 yardes of the ſame kerſey for 6 ſhil. I demaunde whether I gayne or looſe, and how much vpon 100 pound of money: Anſwere, firſte you muſte ſeeke what the 4 yardes of kerſey did coſte: ſaying by the rule of three, if 6 yardes doe coſt 8 ſhillinges, what will 4 yardes coſt: multiply and deuide, and you ſhall finde 5 ſ. $\frac{1}{3}$ and ſo muche did the ſayne

4 yardes cost, therefore abate the same 5 $\frac{1}{7}$ from 6 s. And there will remayne $\frac{5}{7}$ of a shilling, which $\frac{5}{7}$ is gayned in the same 4 yardes of kersey. Then saye agayne by the rule of three, if 5 $\frac{1}{7}$ doe gaine $\frac{5}{7}$, what will $\frac{100}{1}$ gayne? multiply and diuide, and you shyll fynde 12 and $\frac{1}{702}$ whiche $\frac{1}{7}$ beeing abbreuied, is $\frac{1}{12}$, therefore it appeareth that I shall gayne 12 li. $\frac{1}{12}$, vpon the 100 li. in selling 4 yardes of the sayde kersey for 6 shillinges.

16. More, a marchaunt hath boughte a peece of Damaske, which cost hym 8 s. the yarde ready money, and hee selleth the same againe to another Marchaunt, for 10 s. the yard, but hee giueth two dayes for the payment, that is to saye 2 monthes for the one halfe, and 5 monthes for the other $\frac{1}{2}$. The question is to knowe howe muche the sayde firste Marchant doth gaine vpon a 100 li. in 12 monthes after the rate aforesayde? Answere, you must add the 2 monthes and the 5 monthes bothe

togeather, and they make 7 monthes whereof you muste take the one halfe, whiche is 3 monthes $\frac{1}{2}$. And at that time the seconde Marchaunt ought to haue payde the whole, at one entier payment: & therefore say by the fyrst part of the Rule of three composed: If $\frac{4}{1}$ s. in 3 $\frac{1}{2}$ monthes doe gayne $\frac{2}{1}$ shil. what will $\frac{100}{1}$ gayne, in $\frac{12}{1}$ moneths? Multiplye and diuide, and you shall finde 85 li. $\frac{5}{7}$. And so much doth the firste Marchant gayne vpon the 100 in 12 monthes.

17. A Marchant hath bought veluet at 13 s. 6 d. the yard, ready money, and hee selleth the same for 14 s. 2 d. the yard, to bee payde $\frac{4}{5}$ part in ready money, $\frac{1}{2}$ part at 3 monthes, and the rest which is $\frac{5}{12}$, is to be payde to him at 5 moneths. The question is to knowe how much ẏ first Marchant doth gaine vpon the 100 li. in 12 monthes after the same rate? *Answere*, see first at what tyme all the paymentes ought to be payde at once: and for to knowe the

same

same you must multiply euery seuerall payment by the time it ought to bee payd, & adde them togither then diuide the product by the totall summe of all the paymentes being added togeather. And your quotient will shewe at what time all the payments ought to be paid at once, as in the former exãple, $\frac{1}{4}$ parte in readye money is not multiplyed by any time, because it is payde presentlye then $\frac{1}{4}$ parte beeing multiplyed by 3 monethes maketh $\frac{1}{4}$ of a moneth, and the rest being $\frac{3}{4}$ multiplyed by 5 monethes bringeth $2\frac{1}{12}$, then adde $\frac{1}{4}$ and $2\frac{1}{12}$ togeather, and they make 2 monethes $\frac{1}{3}$, the whiche is the iuste tyme that all the paymentes ought to be payd at once. And therefore say by the firste part of the rule of thre compo-sed. If $13\frac{1}{3}$, in 2 monethes $\frac{1}{3}$, do gaine $\frac{1}{4}$ of a pound, what will 100 li. gaine in 12 monethes after the rate? multiply and diuide, and you shall finde 23 pound $\frac{1}{3}$. And so much doth hee gayne vppon the 100 li. in 12 monethes.

18. A Marchant hath bought fustians which cost him 22 s. 6 d. the peece ready money, and hee will sell the same at 24 s. the peece. The questiō is to know what time he ought to giue for the paymēt of the same, to the ende he may gaine after 9 li. vpon the 100 li. in 12 monthes? *Answere*, saye if 22 ½ doe gaine 1 ½: what will $\frac{100}{}$ gaine? multiply & diuide, & you shall finne 6 ⅔ of gaine. Then saye againe by the rule of three, if ⅔ of gaine doe require ½, what will 6 ⅔ of gaine require? multiply and diuide, and you shal find 8 ⅓, which is 8 monthes & ⅓. And so long time ought he to giue, to gain after the rate of 9 li vpon the 100 pound in 12 monthes.

19. A marchant hath bought a peece of Satten being in length 20 yardes, which hee cost him 12 poundes and 10 shil. ready money. I demaund for what price he shall sell the yarde to be payde at the end of 2 monthes, so that he may gaine after the rate of 10 li. vpon the 100 li. in 12 monthes? *Answere*, see

first

firſt what the yarde did coſt him at the firſt, ſaying by the rule of three, if 20 yardes coſt 12 li. 10 ſhil what will 1 yard coſt. multiply and diuide, and you ſhall finde 12 ſhil and 6 d. Then ſaye agayne by the rule of three, if 12 monethes, do giue me 100 li. what will 2 moneths giue, multiplye and diuyde, and you ſhall fynde 1 li. $\frac{2}{12}$. Adde therefore the ſayde 1 $\frac{2}{12}$ vnto 100 and they are 101 $\frac{2}{12}$. Say therefore once agayn, by the rule of three, if $\frac{100}{1}$ doe giue me 101 $\frac{2}{12}$, what will 12 $\frac{1}{5}$ giue? multiply and diuide, and you ſhall fynde 12 ſhil. and $\frac{17}{24}$ is worth 8 d. $\frac{1}{12}$, and for 12 ſhil. 8 d. $\frac{1}{12}$ muſt he ſell the yarde of Satten, giuing 2 monthes time for the payment to gaine after the rate of 10 li. vppon the 100 li. in 12 monthes.

20. More, if 1 li. waight of Sinamõ doe coſt me 8 s. ready money, for what price ſhall I ſell 100 li. waighte of the ſame, to be payde the $\frac{1}{4}$ at 1 month and the reſidue at the ende of 3 monthes, ſo that I may gaine after 9 li. vppon

the

the 100 li. in 12 monthes after the rate? Answere.

$\frac{1}{4}$.	$\frac{1}{1}$.	$\frac{1}{4}$.
$\frac{3}{4}$.	$\frac{3}{1}$.	$2\frac{2}{4}$.
		$2\frac{1}{2}$ *mont.*

seeke first in how long time, both the paymentes should bee made at once. the whiche to doe, you muste multiply eche payment of money by ẏ tyme when it ought to be payde, that is to say, you must multiplye the firste payment which is $\frac{1}{4}$ parte by $\frac{1}{1}$ moneth and thereof commeth $\frac{1}{4}$ of a moneth like wise you must multiply ẏ next paymẽt which is $\frac{3}{4}$ by 3 monthes, & thereof wil come 2 monthes $\frac{3}{4}$, Then adde $\frac{1}{4}$ of a moneth, and 2 moneths $\frac{3}{4}$ both togeather, & they make 2 monthes $\frac{1}{2}$ whiche is the time that both the paymentes oughte to bee payde at once. Then say by the rule of three, if 12 monthes doe giue 9 li. what will 2 monethes $\frac{1}{2}$ giue, multiplye and diuyde, and you shall finde 1 $\frac{7}{8}$, say agayne by the rule of three. If 1 li. waight doe coste me 8 s what will 100 li. cost? multiplye and diuide, and you shall finde 40 pounde.

Then

Then say once againe if $\frac{100}{1}$ doe giue $101\frac{7}{12}$, what will $\frac{40}{1}$ giue? Multiply & diuide, and you shall finde $40\frac{1}{4}$. And for 40 li. 15 s. I must sell 100 pounde waight of Sinamon, to be payde at the 2 seuerall times aforesayde, to gayne therein, after the rate of 9 li. vppon 100 in 12 monthes, as by example aforesayd.

20. When the quarter of wheate doth cost 6 s. 8 d. the loafe of bread waying 20 ounces, is solde for a halfepenie, I demaunde that if the quarter of wheate did cost ten shillinges, for how muche shall the loafe of bread be solde, that wayeth 16 ounces, you shall answere by the firste parte of the rule of three composed, whiche is mentioned in the seconde Chapter of the thirde parte of this booke, where you must say by the same first part of the rule of 3 composed if $6\frac{2}{1}\frac{20}{1}|\frac{1}{2}|\frac{10}{1}|\frac{16}{1}$.

Then multiply the firste number by the seconde, and the producte thereof shall be your diuisors. Likewise multi-

ply

ply the other three numbers the one by the other, and the producte thereof shall be your deuidend: as thus, firste multiply $6\frac{3}{4}$ by $\frac{20}{1}$, and thereof commeth $\frac{400}{4}$ for your deuisor, then multiply $\frac{1}{4}$ by $\frac{10}{1}$, and the product thereof by $\frac{16}{12}$, so you shall haue $\frac{160}{2}$ for your number that is to be deuided, then diuide $\frac{160}{2}$ by $\frac{400}{4}$, and thereof commeth $\frac{640}{800}$ the whiche beeing abbreuied, bringeth $\frac{3}{5}$ of a pennie, and for that price muste y loafe of bread be solde, whiche waieth 16 ounces when the quarter of wheat is worth 10 shillinges.

Or otherwise by the rule of three, at two times. First say, if $\frac{20}{1}$ ounces giue $\frac{1}{4}$, what will $\frac{16}{1}$ ounces giue: multiplie and diuide, and you shall finde $\frac{3}{5}$ of a pennie. Then say agayne, if $6\frac{3}{4}$ do giue me $\frac{3}{5}$, what will $\frac{10}{1}$ giue? Multiply and diuide, and you shall finde $\frac{1}{5}$ of a penie, as afore is sayd.

21. When the cariage of one hundreth waight of Marchandise 50 miles, doth cost 5 s. what shall the cariage of 500 waight

waight cost me for 16 miles. Answere. By the firste part of the rule of 3 composed, saying, if 100 | 50 5 | 500 16 Multiplie 100 by 50, the product will be 5000, which shall be your diuisor. Then multiply 5 times 500 by 16, and thereof commeth 40000 for your dividend, Therefore diuide 40000 by 5000, and you shall finde 8 s.: so much shall coste the carriage 500 waight 16 miles.

Or otherwise, by the double rule of three, that is to say by the rule of three at two times: firste say, if 50 miles do pay 5 s. what shall 16 myles pay, multiplie and deuide, and you shall finde 1 s. $\frac{1}{7}$. Then say agayne, if 100 waighte doe coste mee 1 s. $\frac{1}{7}$, what shall 500 waight cost: Multiply and diuide, and you shall finde 8 s. as before.

22. When the cariage of 100 pounde waight of marchandise 84 miles, doth cost me 6 s, howe many miles maye I haue 64 pounde waight caried for 3 s. 4 d. *Answere*: by the seconde part of the

rule

rule of three composed, and say if $\frac{100}{1}$ $\frac{84}{1}$ | $\frac{6}{1}$ | $\frac{64}{1}$ | $3\frac{1}{3}$.

Then multiplye the fourth number $\frac{64}{1}$, by the third number $\frac{6}{1}$, and thereof commeth $\frac{384}{1}$ for your diuisor, likewise multiply $3\frac{1}{3}$ by $\frac{100}{1}$, and by $\frac{84}{1}$, & you shall haue in the product $\frac{8400}{3}$: then diuide $\frac{8400}{3}$ by $\frac{384}{1}$, and you shal find 72 miles, & $\frac{11}{12}$ of a myle. So manye miles shall the 64 li. weight be caried, for 3 s 4 d.

Otherwise by the rule of three, at two times: Firste say if 100 weighte doe cost me 6 s. what shall 64 pounde weight cost, multiplye and diuide and you shall finde 3 s $\frac{21}{25}$. Then say if $3\frac{21}{25}$ be payde for 84 miles cariage: for how many miles shall 3 s $\frac{1}{3}$ be payde? Multiply and diuide, and you shall finde 72 miles $\frac{11}{12}$, as before.

23. If 100 horses, in 100 dayes, doe spend 180 quarters of otes: howe many quarters of Otes will 350 Horses spend in 150 dayes? *Answere*, by the first parte of the rule of three composed you must multiply 180 times 350, by

150:

150: and deuide the producte by 100 times 100: and you ſhall finde 945 quarters. So many quarters of otes will 350 horſes ſpende, in 150 daies. Or otherwiſe by the rule of 3 at two tymes: firſt ſay, if 100 dayes do yelde me 180 quarters of otes: what ſhall 150 dayes yelde, multiply and deuide and you ſhall finde 270 quarters: then ſay againe, if 100 horſes do ſpend 270 quarters of otes, how many quarters of otes will 350 horſes ſpend, Multiply and diuide and you ſhall finde 955 quarters, as before.

The tenth chapter treateth of the rule of Felowſhip, without any time limited.

THE rule of felowſhip is thus: you muſt ſet downe each mans ſumme of money that he laieth into cõpany, euery one directlye vnder the other. Which ſummes you ſhall adde al together, and the totall

ſumme

ſumme of all them whole ſtocks being thus aſſembled ſhall bee your common deuiſor, to the fynding out of euery mans part of the gayne, then you ſhall multiply either the gayn or elſe ꝑ loſſe which ſoeuer of them doeth happen by eache mans ꝓportiõ of money ꝑ he layd in, and deuide the products by the ſayd diuiſor: ſo ſhall you haue in your quotient euery mans part of the gayne, if any thing be gained, or els of the loſſe if anye thing be loſt.

Example.

1. Two Marchantes haue layde their money in company together, the firſt layde in 500 li. Theſeconde layde in. 300 li, and with occuppying they haue gained 60 li, I demaunde, howe muche each man ſhall haue of ꝑ ſame gaines accordyng to the money that he laide in: *Anſwere*: adde 500 and 300 both together, whiche are the ꝑcels or ſummes that they both layde in, and thereof commeth 800 for your diuiſor: then ſay by the Rule of three;

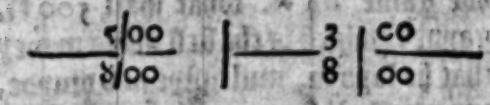
if

ſt 800 li. which is their whole ſtocke) doe gaine 64 li. what ſhall 500 li. gayne? (which is the firſt mans money that he layd in,) multiplye and diuyde, and you ſhall fynde 40 li. for the firſte mans part of the gayne, then ſaye if 800 giue 64, what will 300 gyue? Multiply and diuide, and you ſhall finde 24 li. for the ſecond mans part of the gayne.

500
300 | 800 | 64 | 500.
800
800 | 64 | 300.

Or otherwiſe, put 500 li. which is the firſte mans money that he laid in, ouer the 800 li. which is the whole ſtocke, & you ſhall haue $\frac{100}{100}$, which being abbreuied, doe make $\frac{1}{1}$, and ſuch part of ỹ gayne ſhall the firſt man take, that is to ſay $\frac{1}{1}$ of 64 li. which is 40 li. And conſequently, by the ſame manner, the ſecond ſhall take the $\frac{1}{1}$ of 64, whiche is 24 pound, for his part of the gaine, as

before.



2. Two Marchantes haue companyed togither, the fyrste layde in 640 li. & he taketh $\frac{5}{8}$ partes of the gayne. I demaund howe muche the seconde Marchant layd in, *Answere*, seeing that the first Marchant taketh $\frac{5}{8}$ of the gain it followeth that the second Marchant must haue $\frac{3}{8}$ whiche is the reste, and therefore say by the rule of three, if $\frac{5}{8}$ of the gayne which the fyrste man taketh did lay into the stocke $\frac{640}{1}$. How much shall $\frac{3}{8}$ of the gayne lay in which is the second mans gayne? Multiplye and diuide, and you shall finde 384 li. so much ought the seconde man to laye into company.

3. Two Marchants haue companyed togither, the firste man layde in 640 li. and the seconde hath layde in so muche money for his parte, that hee muste haue 60 li. for his part of 100

li

li. that they haue gained. I demaund howe much the seconde manne did laye into companie. *Answere:* seeing that the seconde man taketh 60 li. of the gaine, it foloweth that the first muste haue the rest of the 100 li. whiche is but 40 pounde. Therefore say by the rule of three, if 40 li. do lay in 640 li. what shall 60 li. lay in? Multiply and diuide, and you shall finde 960 li. So much did the seconde Marchant lay in.

4. Two marchantes haue companied together, the first laide in 83 li. 6s. 8d. the seconde layde in 170 duckets: and they haue gained 100 li. of the which the first man muste haue 60 li. I demaunde what the ducket was worth? *Answere:* seeing that the firste manne muste haue 60 li. it foloweth that the seconde must haue 40 li. therefore say by the rule of three, if 60 li of gayne, that the first man taketh, did lay in 83 li. 6s. 8d. principall, how muche shall 40 li. paune put in, whiche is the gaine

that the seconde man taketh, multiplye and diuide, and you shall finde 55 pound $\frac{1}{93}$ so much are the 170 duckets worth Then put 55 li. $\frac{1}{5}$ into shillinges, and you shall haue 1111 s. $\frac{1}{5}$. So then for to knowe what the Ducket is worth, saye by the rule of three, if $\frac{170}{1}$ giue 1111 $\frac{1}{93}$, what will $\frac{1}{1}$ giue, multiplye and diuide, and yau shall finde 6 shil. 6 d. $\frac{22}{51}$: so much is the ducket worth.

5. Two Marchauntes haue companied together, the second man layde in more by 30 li. then did the firste man, and they gained 120 li. of the which ỳ first man oughte to haue 50 li. I demaund what each of them did laye in? *Answere*, from 120 li. abate 50 li. and there resteth 70 li. for the second mans parte: so that by this meane the second man (because he layde in 30 li. more then the first man did, taketh 20 pound more of the gayn, & therfore say by the rule of three if 20 li. gain did lay in 30 li. principal, how much shall 50 pound gaine lay in? Multiplie & diuide, and you

you ſhall finde 75 li: ſo muche did the firſt man lay in, and conſequently the ſeconde layde in 105 li.

6. Two Marchantes haue companied togeather, the ſeconde hath laide in twiſe ſo much as the firſt man did, and 10 li, moze: and they haue gained 100 li: of the which the firſt ought to haue 32 li. foz his part: I demaunde howe muche each of them did lay into cõpany *Anſ.* If it were not foz the 10 li. that the ſecond man layd in moze then the firſt, he ſhoulde haue had but 64 li. of the gaine, whiche is the double of the firſte mannes parte But becauſe he layde in 10 li. moze, he hathe therefoze 4 pounde moze of the gayne, and therefoze ſay by the rule of three, if 41. gaine did lay in 10 li. of pꝛincipall (which was ouer & aboue the double of the firſt mans laying in) what ſhall 32 li of gaines lay in: which is the firſt mans parte of the gaines that he taketh. Multiply and diuide, and you ſhall finde 80 li, foz the firſt mannes laying in: and conſequently 150 li.

for the seconde mans portion that he layed in.

7. Two marchants haue companied together, and they haue gayned 100 li. of the which the first must haue after the rate of 10 li. vpon the 100 li and the second must haue after the rate of 15 li. vpon the 100 li I demaunde how much each of them ought to haue *Answere:* Put 10 li for the first mannes laying in, & 15 li. for the second mans laying in, Adde therefore 10 li and 15 li. together, and they make 25 li. Then put 10 ouer 25, & it is $\frac{10}{25}$ which beeing abbreuied are $\frac{2}{5}$ Therefore he that taketh 10 li. vpon the 100 li. must haue the $\frac{2}{5}$ of the gaine, which is 40 li. Then put 15 ouer 25, & it is $\frac{15}{25}$ which beeing abbreuied are $\frac{3}{5}$. Therefore the second must haue $\frac{3}{5}$ of the 100 li. which is 60 li.

8. Two marchantes haue companied together, the first layde in 46 li. 18 s. and the seconde layde in 33 li. 2 s. so they

they haue gayned 30 li. I demaunde howe muche euerye man shall haue for his part of the gayne? Answere, Adde 46 li. 18 s. and 33 li. 2 s. both together and you shall finde 80 li. for your common diuisor, then saye if 80 li. which is all their stocke, doe gayn 30 li. what will 46 li. 18 s. gayne, which is the money that the fyrst man layd in, Multiply & diuide, and you shall finde 17 pounde 11 shil. 9 pence, for the fyrst mans part of the gayne. Then say agayne by the rule of three, if 80 li. doe gayne 30 li. what will 33 li. 2 s. gayne, which was the seconde mans money that he layde in, multiply & diuide, and you shal finde 12 li. 8 s. 3 d. for the second mans part of the gayne.

And after the same manner shal you do in case there were three or foure Marchants that would company togeather adding all and euery of their summes of money which they layd into ỹ stock, into one totall summe whiche shall bee your common diuisor, and then worke with the rest, as is taughte in the for-

mer question of the rule of company.

Example.

9. Three Marchauntes haue compa-nied togither, the fyrst laide in I know not howe muche: the seconde did put in 20 peeces of cloth: and the thirde hath layde in 500 pound. So at the ende of their company, their gaynes a-mounted vnto a 1000 li. whereof the fyrst man ought to haue 350 pound, & the seconde must haue 400 pound.

Now I demaunde howe muche the first man did lay in, and for how muche the 20 peeces of clothe, were put into company.

Answere.

Seeing that the firste and the se-cond Marchauntes must haue 750 li. for their partes of the gaine. Then the thirde man must haue the reste of the 1000 li. which is 250 li. And there-fore say by the Rule of three, if 250 li.

gaine

gaine, be come of 500 li. principall, of howe muche ſhall come 350 li. gayne: which the firſt man taketh, multiplye and diuide, and you ſhall finde 700 li. So much did the firſt man lay in: then ſay if 250 li. gaine, be come of 500 li. principall, of howe muche will come 400 li, which is the gayne that the ſeconde man taketh. Multiplye and diuide, and you ſhall finde 800 li. For that price were the 20 peeces of clothe layde into company.

10. Three Marchants haue gained 100 li. the firſt muſt haue the $\frac{1}{2}$, the ſeconde muſt haue $\frac{1}{3}$. And the third muſt haue $\frac{1}{4}$. I demaunde howe muche euery man muſt haue of the gayne? *Anſ.* Reduce $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$, into a common denomination, after the order of the ſeconde reduction in Fractions, and you ſhall finde $\frac{12}{24}$, for the $\frac{1}{2}$, $\frac{8}{24}$, for the $\frac{1}{3}$ and $\frac{6}{24}$, for the $\frac{1}{4}$: Then take 12 for the firſte mans laying in, 8 for the ſeconde mans laying in, and 6 for the thirde mans laying in. The whiche three

three numbers being added together, shall be your common diuisor, and they doe make 26, then multiplie 100 li. by 12 for the first man: then agayne 100 li, by 8 for the seconde, and laste of all 100 li. by 6, for the thirde man. And diuide the productes of euery multiplication by 26. So shall you finde 46 li. $\frac{2}{13}$ for the first mans part of the gayne 30 li. $\frac{10}{13}$ for the seconde mans part and 23 li. $\frac{1}{13}$ for the thirde mans part.

11. Two Marchauntes haue gayned 100 li. the first muste haue $\frac{1}{2}$ and 5 li. more, the second must haue $\frac{1}{4}$ and 4 li. more, I demaunde how muche eache of them shall haue? Aunswere, first from 100 abate 5 and 4, which are 9 so there wil remayne 91, then take the $\frac{1}{2}$ of 100 li. which is 50 li. for the first mans laying in. Likewise take $\frac{1}{4}$ of 100 li. for the second mans laying in, which is 33 li. $\frac{1}{4}$. Then adde 50 li. & 33 li. $\frac{1}{4}$ togither, and you shall haue 83 li. $\frac{3}{4}$ for your common diuisor, then multiply 91 pound by 50, and diuide

by

by 83 $\frac{1}{7}$. and thereof commeth 54 li. $\frac{3}{7}$, vnto the whiche number adde 5, and all is 58 li. $\frac{3}{7}$ for the first mans part of the gayne. Likewise multiplye 91 by 33 $\frac{1}{7}$, and diuide by 83 $\frac{1}{7}$. and you shall finde 36 li $\frac{2}{7}$, vnto the whiche adde 4, and you shall haue 40 li. $\frac{2}{7}$ for the seconde mans part.

12. Two Marchantes haue gayned 100 li. the firste muste haue the $\frac{1}{2}$ lesse by 4 pounde, the seconde must haue $\frac{1}{2}$ lesse by 2 pounde. I demaunde howe much each of them shal haue, Answere Adde 4 and 2 with 100, & they make 106. Then take as before is sayde, 50 li. for the fyrst man, and 33 $\frac{1}{3}$ for the seconde, and adde them both togeather and they be 83 $\frac{1}{3}$ which shall bee youre diuisor. Then multiply 106 by 50, and diuide the product by 83 $\frac{1}{3}$, so thereof commeth 63 li. $\frac{1}{3}$. From the whiche abate the 4 li. lesse, that the fyrst man taketh, and then is there remayning 59 li. $\frac{1}{3}$, for his parte. Likewise multiply 106 by 33 $\frac{1}{3}$, and diuide by 83 $\frac{1}{3}$, and

and you shall finde 42 li $\frac{2}{7}$, from the which abate 2 li. lesse, and there remayneth 40 pound $\frac{2}{7}$ for the seconde mans parte.

The Rule of Fellowship with time.

The money that euerye man layeth in, must be multiplyed by the time that it continueth in companye: and of that which cõmeth thereof, you shall make their new layinges in, for each of them, and then multiply the gains by euery one of them seuerallye, and the of comes you shall diuide by all theire new layinges in, added togither, and then you shall haue proporcyonallye, each mans part of the gayne, according to his laying in.

Example.

1. Two Marchants haue companied togerher, the fyrst hath put in the first of Januarye 450 pounde, the seconde did laye in the 2 of May 750 pounde,

And

And at the yeres ende they had gained 100 li I demaunde how much each of them shall haue of the gayne: Anſ. forasmuche as the firſt did put 450 li. the firſt of Januarie, his money continued in company 12 monthes, & therfore multiply 450 by 12 months, and thereof commeth 5400, for his newe laying in. And the ſeconde laide in his 750 li but at the firſt day of May: ſo that his money remaineth in company but 8 mõthes. Therfore multiply his 750 li. by 8, & thereof commeth 6000 for his new laying in: Then add 5400 with 6000, and they make 11400 for your common diuiſor: Then multiply 100 li. which is the gaines by 5400: & diuide the product by 11400, and ther of wil come 48 li. $\frac{7}{19}$ for the firſt mans part of the gayne. Likewiſe multiply 100 by 6000, and diuide the producte by 11400, and you ſhall finde $52\frac{13}{19}$: & ſo muche muſte the ſeconde man haue for his part of the gayne.

2. Two marchauntes haue companied together, the firſt hath layde in the

firſt

first of Januarie, 640 li. The seconde can lay in nothing vntill the firste of Aprill. I demaund how much he shall then lay in, to the ende that he maye take halfe the gaynes: *Answere*: Multiply 640 li. by 12 monthes, that his monye abideth in companie, and therof will come 7680 li. for his laying in. And so muche ought the seconde man to lay in, for because he taketh $\frac{1}{2}$ of the gayne. But for that, that he putteth in nothing vntil the first of Aprill, his money can be in company no longer then 9 monethes. And therefore diuide 7680 by 9. and thereof wyll come 853 li. $\frac{1}{3}$ So muche ought the seconde Marchant to lay in the first of Aprill, to the ende that he may take the one halfe of the gaynes.

3. Three Marchantes haue companied together, the first laide in the first of Marche 100 li. The seconde laide in the first of June, so muche money, that of the gaine he must haue the $\frac{1}{7}$ parte: and the thirde layde in the first of Nouember

member so muche money, that of the gaynes he must haue likewise $\frac{1}{12}$ & they continued in company, vntil the next Marche following. I demaunde how muche the seconde and the thirde Marchants did lay in? Answere: Multiply 100 li. which the first man did lay in, by 12 monthes, that his money continued in company, and therof commeth 1200 for his laying in, and so much ought the seconde and the thirde Marchantes each of them to lay in, bicause they part the gaynes by thyrdes. But for that, that the second Marchaunt layeth in nothing till the fyrst of June his money can be in company but 9 monthes. Therefore diuide 1200, by 9 monthes, and thereof will come 133 $\frac{1}{3}$. And so muche oughte the seconde Marchant to lay in. Then, for asmuch as the thirde Marchant did laye in nothing vntill the fyrste of Nouember, his money abideth in company but the space of 4 monthes. Therefore diuyde 1200 by 4, and thereof commeth 300 li. And so much ought the third Marchant

chant to lay into company.

4. Three Marchantes haue companied together, the first laide in the first of January, 100 duckets. The second hath layde in 50li. the first of March, and the third put in a Jewell the first of July, and at the yeeres ende, they had gained 400 crownes: of the which the first Marchante muste haue 50 crownes, and the seconde muste haue 80. I demaunde what the Ducket was worth, and at what price the Jewell was valued. whithe the thirde Marchant laide in: *Answere*, the first mannes money beeing 100 Duckets multiplyed by 12 is 1200 Duckets by the rule aforesayd, and bee taketh 50 crownes of the gaine: therefore say, yf 500 crownes gaine be come of 1200, whiche was his stock, of howe muche shall come 80 crownes gaine, that the second man taketh: Multiply and diuide, and you shall finde 1920, for the seconde Marchantes laying in Then say againe, if 50 crownes bee come

come of 1200 stocke, of howe muche shall come 270 crounes, whiche the third man taketh of the gaine; multiplie and diuide, and you shall finde 6480, for the third marchantes laying in. Then diuide 1920, whiche is the seconde mans laying in, by 10 months that his money did continue in company, and you shall find 192 Duckets whiche are worthe 50 l. bycause hee layde in 50 l. Then diuide 50 l. (being first reduced into shillings by the sayde 192 Duckets) and thereof will come 5 shillings 2 pence ½ So muche was the Ducket worthe: Finally, diuide 6480, (which is the thirde mans laying in) by 6 months that his Jewel remained in company, and you shal find 1080 Duckets, and for that price was the Jewell put into companie.

5. Three marchantes haue companied together: The first layd in the firste of January 100 l. and the firste of Aprill, he hath taken backe againe 20 li.

The seconde hath layde in the firste of Marche 60 li. and afterwarde he did lay in more 100 li. the first of August. The third layd in the first of July 150 li. And the first of October he did take backe agayne 50 li. And at the yeares ende, they founde that they had gayned 160 li. Demaund how much euery man shall haue of the gayne. *Anſ.* Multiply 100 li which the first manne layde in by 12 moneths, and thereof commeth 1200 li from that number abate 9 times 20 li. which are 180 for that which he did take bake agayne: and there will remane 1020 li. for the first mans laying in. Then multiply 60. which the seconde man layd in by 10, and you shall haue 600: vnto the which add 5 times 100 li. for y money he layde in more the firste of auguste, which are 500, so al amonteth to 1100 for the second mans laynge in. Afterwardes multiply 150 pounde, which the third man hath layde in, by 6 monethes, and thereof commeth 900, from the which number abate 3 times 50 li. they

they are 150 for the money that he did take backe agayne the first of October so there will remane 750 for the third mans laying in. Then proceede with the rest, as is taught in the first question of the Rule of Felowship with time, in adding 1020, 1100, and 750 altogether: whiche shall be your Diuisor. Then multiply 160 li. which is the gayne by 1020, by 1100, and by 750: and diuide at euery time by your Diuisor, that is to say, by alltheir layinges in, added together, whiche is 2870: so you shall finde $56\frac{240}{287}$, for the first man: $61\frac{220}{287}$, for the seconde: and $41\frac{211}{287}$ for the thirde man.

6. Two Marchantes haue companied together, the first hath laide in 960 pounde, for the space of 12 monthes, and he ought to haue 8 pounde vpon the 100 pound of the gaine. The second hath layde in 1120 li. for the space of 8 monthes, and he oughte to haue after 12 pounde vpon the 100 pounde of the gayne.

his person, and forbicause that hee will haue halfe of the gaine, you shall adde 80 li. with 540 li. and thereof commeth 320 li. of the which take the halfe, which is 160 li. and from the same you shall abate the 80 li. & there will remayne other 80 li. whiche hee ought to lay in of ready money, and ỹ marchant must lay in the ouerplus, which amounteth to 160 li.

10 A marchant hath deliuered to his Factor 1200 li. to gouerne them in the trade of marchandise, vpon such condition, that he for his seruice shall haue the $\frac{1}{5}$ of the gaine, yf any thing be gained, and hee shall beare the $\frac{1}{5}$ of the losse if any thinge be losse: I demaunde for howe muche his person was esteemed? Answere, seeing that the Factor taketh the $\frac{1}{5}$ of the gaine, his person oughte to bee esteemed as muche as $\frac{1}{3}$ of the storke whiche the Marchant laieth in, that is to say, the $\frac{1}{3}$ of 1200 li. whiche is 600 li. The reason is, forbicause the $\frac{1}{5}$ of the gaine

that

in such proportion to the stocke, which the marchant layeth in, as ỳ gayne of ỳ sayde Factor is vnto the gayne of the marchaunt. As thus, if a marchant doe deliuer into the handes of his Factor 200 li. to imploye, and he to haue halfe the profite, the person of the sayd Factor shall be esteemed to bee worth 200 li. And if the Factor doe take but the $\frac{1}{3}$ of the gayne, he should haue but $\frac{1}{3}$ so much of the gayne as the marchant taketh which must haue $\frac{2}{3}$, wherefore the person of the Factor is esteemed but the $\frac{1}{2}$ of that which the Marchant layeth in, that is to say 100 li.

And if the factor did take the $\frac{2}{3}$ of the gayne, then the Marchant shal take the residue whiche are $\frac{1}{3}$ of the gayne: wherefore the gayne of the Marchant vnto that of the Factor, is in suche proportion as 3 vnto 2. Then if you will know the estimation of the person of the Factor, say if 3 giue me 2 what will 200 giue? Multiplye 200 by 2, and diuide by 3, so you shall finde 133 $\frac{1}{3}$. Or otherwise, you must consi-

ber that the Factor taketh the $\frac{2}{7}$ of that which the Marchant taketh And therefore take the $\frac{2}{7}$ of 200, & you shall finde 133 $\frac{1}{7}$, as before, and so much is the person of the factor esteemed to bee worth.

8. And if the Marchant shoulde delyuer vnto his factor 200 li, and the Factor woulde laye in 40 li. and his person, to the ende he mighte haue the halfe of the gayne: I demaund for how muche shall his person bee esteemed? Answere: abate 40 li. from 200 li. and there will remaine 160 li. And at so muche shall his person be esteemed.

And if the Factor woulde take the $\frac{2}{3}$ of the gayne, his person with his 40 pound, shal be esteemed twise as much as the stocke that the Marchant laieth in, which should haue but $\frac{1}{7}$ of ỹ gayne for $\frac{2}{7}$ vnto $\frac{1}{7}$ is in double proportion. Therefore double 200 pounde, and thereof commeth 400 li. frō the whiche abate 40 li. & there will remayne 360 li. But if the Factor woulde take one

ly the $\frac{1}{5}$ of the gayne, that shal be but the $\frac{1}{5}$ of $\frac{3}{5}$ which the Marchant taketh and then the estimation of his person with his laying in should be esteemed but the halfe of that which the Marchãt layeth in, you must therefore take the $\frac{1}{2}$ of 200 li. which is 100 li. from the which you shall abate 40 pound, and the rest, which is 60 li. the estimation of his person.

9. If it so chaunce for to make traffickes of 240 li. that the person of the factor should be in such wise esteemed, that he should haue but the $\frac{1}{4}$ of the gayne, and yet he would haue the $\frac{1}{10}$, I demaund how muche ready money he ought to lay in, besides his person

Answere: Seeing that his person gaineth the $\frac{1}{4}$, therefore all the whole laying in, which is 240 li. shall gayne the rest, that is to say the $\frac{1}{4}$: now forbicause $\frac{1}{10}$, is the $\frac{1}{5}$ of $\frac{1}{4}$, therefore his person shalbe esteemed the $\frac{1}{5}$ of all the laying in. Take then the $\frac{1}{5}$ of 240 li. and you shall haue 80 li. for the estimation of

And at the yeares ende they haue gayned 800 li. I demaund how much each of them shall haue of the gayne? *Answere:* multiplye 960 that the first man did lay in by 12 monthes, and the product thereof multiplye agayn by 8, and you shall haue 92160 that the first mans laying in, then multiply 91120 that the second hath layd in, by 8 moneths, and that which commeth thereof, you shall multiply agayne by 12, & you shall finde 107520, for the seconde mans laying in, then proceede wyth the rest, as in the firste question of the rule of Fellowshyp is declared, and as in the last Exaple I haue taughte you, and you shall finde 369 li. $\frac{1}{11}$ for the first man: and 430 li $\frac{10}{11}$ for the second man.

The rule of companye, betweene *Marchauntes, and their Factors.*

7. NOte that the estimation of the body or person of a Factor, is in

that the factor taketh, is the $\frac{1}{7}$ of the $\frac{2}{7}$ of the gayne that the Marchant taketh. And so the Factor his person is esteemed to be worth 600 li.

11. A marchante hath delivered vnto his Factor 1200 li. and the Factor layeth 500 li. and his person. Nowe, because hee layeth in 500 li. and his person, it is agreede betweene them y he shall take the $\frac{1}{7}$ of the gaine: I demaunde, for howe muche his person was esteemed: Answere, Forasmuche as the Factor taketh the $\frac{1}{7}$ of the gaine he taketh the $\frac{2}{7}$ of that which the Marchant taketh, for $\frac{2}{7}$ are the $\frac{2}{7}$ of $\frac{1}{7}$: and therefore the Factors laying in, ought to be 800 li. whiche is the $\frac{2}{7}$ of 1200 li. that the Marchant layd in. Then abate 500 li. which the Factor did lay in, from 800 li. which should bee his whole stock, and there remayneth 300 li. for the estimacion of his person.

12. More, a marchaunt hath delivered vnto his Factor 1000 li. vppon such

such condition, that the Factor for his paines and seruice shall haue ỳ gaines of 200 li. as though hee layde in so muche ready money: I demaund what portion of the gaine the saide Factor shall take? *Answere*, See what parte the 200 li. (whiche the Factor layde in) is of 1200, whiche is the whole stocke of their company. & you shall finde that it is the $\frac{1}{6}$, and suche part of the gaine shall the Factor take.

But in case, that in making their couenantes, it were agreed betweene them, that the Factor should haue the gaine of 200 li. of the whole stocke, which the marchant layeth in, that is to say, of the 1000 li. Then should the Factor take the $\frac{1}{5}$ of the gaine: for 200 li. is the $\frac{1}{5}$ of a 1000 li.

The xi chapter treateth of the *Rules of* Barter: *that is to say to change ware for ware, &.*

TWo marchants will change their marchãdise, the one with the

the other. The one of them hath cloth of 7 s. 1 d. the yarde, to sell for readye money, but in barter he will sell it for 8 s. 4 d. The other hath Synamon of 4 s. 7 d. the li. to sell for ready moneye I demaund how hee shall sell it in barter that he be no loser. Answere say if $7\frac{1}{12}$: (whiche is the price that the yarde of cloth is worth in readye money) bee solde in barter for $8\frac{1}{7}$, for what shall $4\frac{7}{12}$, bee solde in Barter which $4\frac{7}{12}$ is the price that the li. of Synamon is worth in readye money, reduce the whole numbers into their broken, and then multiplye and diuide and you shall finde 5 s. 4 d. $\frac{12}{17}$ partes of a peny, and for so muche shall he sell the pound of Synamon in Barter.

2. Two marchants will barter their marchandise the one with the other, ỳ one of them hath Chamlets, of 2 li. 18 s. 5 d. the peece, to sell for ready money, and in barter he will sell the peece for 4 li. 3 s. 4 d. ỳ other hath fine caps of 35 s. 10 d. the dosen, to sell in barter

ter. I demaunde what the Dossen of cappes were worth in readye money? Anſ. say if 4 li. 3 s̄ 4 d̄, which is ꝑ ouer ꝓice of the peece of Chālet, be come of 2 li. 18 s̄. 4 d̄. which was ꝑ iuſt ꝓice of ꝑ ſame, of what ſhall come 35 s̄. 10 d̄. which is the ouerꝓice of the doſen of caps? Multiply and diuide, and you ſhall finde 25 s̄. 1 d̄. and ſo muche are ꝑ doſen of caps worth in ready money.

3. Two Marchauntes will chaunge their Marchandiſe the one with the other: the one of them hath Fuſtians of 18 s̄. 4 d̄. the peece, to ſell for ready money, and in barter he will ſell the peece for 26 s̄. 8 d̄. The other hath Tapiſtrie of 15 d̄. the elle, to ſel for ready money, and in barter he will ſel it for 20 d̄. the elle, I demaunde which of them gayneth, and how much vpon the 100 li. of money? *Anſwere*: say if 18 s̄. $\frac{1}{7}$ which is the iuſt ꝓice of the peece of Fuſtiā) be ſolue in barter for 26 s̄. $\frac{2}{7}$? for how much ſhall 1 s̄. $\frac{1}{4}$, whiche is the iuſte ꝓice of the elle of tapiſtrie (be ſolue in barter

barter: multiply and diuide, and you shall finde 21 li. $\frac{2}{11}$. And he doth ouersell it but for 20 li, so that of 21 li. $\frac{2}{11}$, he maketh but 20 li. And therefore say by the rule of three if the second Marchant of 21 $\frac{2}{11}$, doe make but $\frac{20}{1}$, how much shall he loose in the $\frac{100}{1}$: Multiply and diuide, & you shal find 91 $\frac{1}{11}$, the whiche beeing abated from 100, there will remayne 8 $\frac{1}{11}$. And after the rate of 9 $\frac{1}{11}$ doth the seconde marchant loose in the 100. And consequentlye, the firste marchant of 20 li. maketh 21 li. $\frac{2}{11}$, and therefore say agayne by the rule of 3, if the firste marchant of $\frac{20}{1}$, do make 21 $\frac{2}{11}$, how much shal he gayne vpon $\frac{100}{1}$, Multiply and diuide, and you shall finde 109 li. $\frac{1}{11}$. And thus the fyrste marchant gaineth after the rate of 9 li $\frac{1}{11}$ vpon the 100 li. of money.

For your better vnderstanding of these questions, you must note that when one Marchant gayneth of an other, after the rate of 10 li. vppon the 100 li. he gayneth the $\frac{1}{10}$ of his owne principall, and the other which loseth

after

after the rate of 9 $\frac{1}{11}$ in the 100 li. he loseth the $\frac{1}{11}$ of his principall. And it may be prooued thus: when one Marchāt will sell his wares vnto another, whiche wares stande him but in 100 li. and he will sell them for 110 li. therefore he of his 100 li. maketh 110 li. and so he gayneth after 10 li. vppon the 100, which is the $\frac{1}{10}$ of his principall, and the other which buieth wares for 110 li. ẏ cost the other but 100 l. of the 110 li. he maketh but 100 li. And therefore say by the rule of 3, if 110 be come of 100, of how much shall come 100? Multiplie & diuide, and you shall finde 90 $\frac{10}{11}$, the which abate from 100 and there will remayne 9 $\frac{1}{11}$, which is the $\frac{1}{11}$ of the principall, that the second loseth in the 100 li. as afore is sayde. And therefore who so that will knowe what one marchaunte gayneth of an other, eyther after the rate of 10 li. vppon the 100 li. whiche is the $\frac{1}{10}$ of his principall, or else after the rate of 20 li. vpon the 100 li. which is the $\frac{1}{5}$ or of onye other parte, and that he would

likewise knowe what parte the other loseth of his principall, he must take for the numerator of the broken number of him that loseth, as much as for him that gayneth, then adde the Numerator and the denominator (of the broken number of him that gayneth) both togeather, and make therof the denominator of the broken number of him that loseth, and then shall you haue the iust part of him that loseth; as by example, of him that gayneth after 10 li. vpon the 100 li. which is the $\frac{1}{10}$ of his principall: take the numerator of $\frac{1}{10}$ which is 1, and make that the Numerator of the broken number of him that loseth, then adde 1, whiche is the numerator of the Fraction of him that gaineth with 10, whiche is his denominator, and you shall haue 11 for the denominator of the fraction of him that loseth. Then put 1 ouer the 11, and so you shall haue $\frac{1}{11}$. Thus it appeareth when one Marchant gayneth of another, after 10 li. vpon the 100 li. he gayneth the $\frac{1}{10}$ of his principall, & the

other

other looseth 9 $\frac{1}{11}$, which is the $\frac{1}{11}$ of his principall. And if he woulde gayne after 20, vpon the 100 li. which is the $\frac{1}{5}$ of his principall, the other shoulde lose 16 $\frac{1}{11}$, which is the $\frac{1}{5}$ of his principall, and so is to bee vnderstoode of all other fractions.

4. Two Marchantes will chaunge their marchandise the one with the other, the one of them hath Sayes of 20 s. and 10 li. the peece to sell for readie money, and in barter hee will sell the peece for 23 s. 4 li. and yet hee will gayne moreouer, after 10 pounde vpon the 100 pounde. The other hath woll of 50 s. the 100 waighte to sell for readie money. I demaunde howe hee shall sell C. of woll in barter? Answere, say if 20 s. 10 li which is the inst price of the peece of Saye, be sold in barter for 23 s. 4 li. for howe muche shall 50 shil. (whiche is the inste price of the C. of woll) be solde in barter? multiplye and diuide, and you shall fynde 56 s. Then for because the first marchant wil gain after

after 10 li. vpon the 100 li. he maketh of his 100 li. 101 so the seconde marchant maketh of 110 li. but 100 li. And therfore say by the rule of 3, if the seconde marchant of 110, do make but 100, how much shall he make of 56? Multiply and diuide & you shall finde 50 li. 18 d. $\frac{2}{11}$ of a peny, & for so much shall hee sell the hundred of woll in barter.

5. More, two marchantes will change their marchandise, the one with the other, the one of them hath Taffeta, of 16 crownes the peece, to sell for ready money, and in barter hee will sell the peece for 20 crownes, and yet he will gaine moreouer after the rate of 10 li. vpon the 100 pound. The other hath Ginger of 3 s. 9 d. the pound waygh, to sell in barter. I demaunde what the hounde did cost in ready money Anſ. say if 20 crownes which is ye surprice of the peece of Taffeta, be come of 16 crownes the iust price, of howe much shall come 3 s. 9 d. which is ye surprice

of the pounde of Ginger: Multiplye and diuide, and you shall finde 3 shil. Then, for bicause that the Marchaunt of Taffeta will gayne after the rate of 10 vppon the 100: saye if 100 doe giue 110: what will 3 s. giue: multiplye and diuide, and you shall find 3 s. 3 d. $\frac{1}{5}$, and so muche did the pounde of Ginger cost in ready money.

6, More two Marchantes will change their marchandise the one with the other, the one of them hath worsteds of 25 s. the peece, to sell for ready money and in barter he will sell the peece for 25 s 4 d. and yet he looseth after 10 li. in the 100 li. the other hath waxe of 3 li. 6 s. 1 d the 100 waighe to sell for ready money. I would know for what price he should sell his waxe in Barter: *Answere*: say if 25 s. whiche is the iuste price of the peece of worsted, be solde in barter for 33 s. 4 d. for howe muche shall 3 pounde 6 s. 8 d. be solde, whiche is the iuste price of the 100 of waxe, as it was worthe in redye money,

ney. Multiply & diuide, and you shall finde 4 li. $\frac{4}{9}$, which is 8 s. 10 d. $\frac{2}{3}$, then for because that the Marchant of worsteds, loseth after 10 li. in the 100 li. of 100 li. he maketh but 90. And therfore say, if 90 giue 100 what giueth 4 pound $\frac{4}{9}$, Multiply & dyuyde, and you shall finde 4 li. $\frac{76}{81}$, which is worth 18 s. 9 d. $\frac{8}{27}$, and for so much shall he sell 100 pound waight of waxe in barter.

7. More, two Marchauntes will change their marchandise the one with the other, the one of them hath Worsteds of 5 li. 6 s. 8 d. the peece, to sell for ready money, and in barter he will sell the peece 6 li. 13 shil. 4 d. and yet he looseth after 10 li. in the 100, and the other hath Muske of 2 s. 9 d. $\frac{2}{3}$ the pound waighte to sell in barter. I demaunde what the pounde did colle in ready money? Answere: say if 6 li. $\frac{2}{3}$, which is the ouer price of the peece of Worsted, be come of 5 li. $\frac{2}{3}$, which is ye iust price of the same, of howe muche

shall come 2 s. 9 d. ¼. Multiplye and diuide, and you shall find 2 s. ⅔, which ⅔ is 2 d. ¼: then for because that the marchant of Worstede loseth after 10 li. in the 100 li. of a 100 he maketh but 90, and therefore say, if 100 giue but 90, how muche shall 2 s. ⅔ giue, multiply and diuide, and you shall fynde 2 phil. and so muche coste the pounde of Wulke in ready money.

Other Rules of Barter, wherein is *giuen some part in ready money.*

When a Marchante ouerselleth his Marchandise, and he will haue also some parte of his ouerpryce in ready money: as the ½ the ⅓ or the ¼ &c. He must subtracte the same parte of money from the iuste pryce, and also from the ouerpryce of his Marchandise: and the two numbers that remayne after the subtraction is made, shall bee the two firste numbers in the rule of three, and the iuste pryce of the seconde Marchant shall bee the thyrde num-

number 1 to knowe how much he shall ouersell the parte of of his marchandise

Example.

3. Two Marchaunces will chaunge their marchandise the one with the other, the one of them hath fyne Woolle, at 5 li. the 100 pound waight to sel for ready money, and in barter he will sell it for 6 li. and yet hee will haue the $\frac{1}{3}$ in ready money. The other hath cloth of 13 s. 4 d. the yarde to sell for readye money. I woulde knowe how he shall sell the same in bar. Answere, take the $\frac{1}{3}$ of 6 li. whiche is ye ouerprice of ye 100 of wool, & that is 2 li the whiche you must abate from 5 li. whiche is the iuste prize of 100 of wool, and also abate it from 6 li. which is the ouerprice, and there shal rest 3 li. and 4 li. for the two first numbers in the rule of three, then take 13 s. 4 d. which is the iuste prize of a yarde of cloth, for the thyrde number: Then multiply & diuyde, and you shall finde 17 s. 9 d. $\frac{1}{2}$ for so much shall

the seconde sell his cloth in barter.

9. More, two marchants will change their marchandise the one with the other, the one of them hath ware of 3 li. 6 s. 8 d. the C. to sell for readye money and in barter he will sell the same for 4 li. 3 s. 4 d. and yet he will haue the ¼ in ready money, and the other hath fine Crimson sattin of 15 s. the yarde to sell in barter. I demaund what it is worth in ready money. Answere, Take the ¼ of 4 li. 3 s 4 d. which is 1 li. 0 s. 10 d. and abate it from 4 li. 3 s. 4 d. & also from 3 li. 6 s. 8 d. & there resteth 3 li. 2 s. 6 d. and 2 li. 5 s. 10 d. for the two fyrst numbers in the rule of three. And 15 s. for the thyrde number which 15 s. is the ouerprice of the yard of Sattin, then multiply and dyuyde, and you shall finde 11 s, And so much did the yarde of Sattin cost in readye money.

10. Two Marchantes will chaunge their Marchaundise the one with the other

other, the one of them hath tinne of 50 s. ꝑ 100 li waight to sel for ready money, and in barter he will sell it for 3 li. 6 s. 8 d. and he will gaine after 10 li. upon ꝑ 100. and yet hee will haue also the one halfe in ready money. The other hathe Leave of 3 halfepence the li. to sell for ready money. I demaund how he shall sell ꝑ li. of Leave in barter. *Answere.* See first at 10 li. upon the 100 li. what the 3 li. 6 s. 8 d. will come vnto, in saying by the Rule of three: if 100 giue 3 li. 6 s. 8 d. what will 3 li. giue? multiply and diuide, & you shall finde that they will come to 3 li. 13 s. 4 d. of the which, the halfe which he demaundeth in ready money, is 3 li. 6 s. and 8 d. the same being abated from 50 s. and also from 3 li. 13 s. 4 d. there will remaine 13 s. 4 d. and 1 li. 16 s. 8 d. for the two firste numbers in the rule of three, which you must put all into halfepence, & the afore sayde three halfepence shall be the thirde number, and then multiply and diuide, and you shall finde 4 d. ½ and for so much shall

The 12. chapter treateth of the exchanging of Money from one place to another.

FIrst you muſt note that at Andwerpe they vſe to make their accountes by Denters de gros, that is to ſay by pence Flemiſhe, whereof 12 doe make 1 ß Flemiſhe, and 20 ß. Flemiſh doe make 1 li. de groſſe.

Example.

1. If I deliuer in Flaunders 500 li. Flemiſhe, of 19 ß. 6 d. de gros, that is to ſay at 19 ß. 6 d. Flemiſh, to receiue 20 ß. at London, I demaunde howe muche I ſhall receiue ſterling at London, for the ſayde 500 li. Flemiſhe. Anſwere: Say if 19 ½ giue 20/1, what will 500/1 giue? Multiplye and diuyde, and you ſhall finde 512 li. 16 ſhil. 4 d. ½ of a penie. And ſo muche ſterling ſhall I receiue in London for my 500 li. Flemiſhe.

2. If I delyuer in London 375 li. ſterling, to receiue in Andwerpe 21 ſ. 9 d. the groſſe, that is to ſay, Flemiſh, for euery pound ſterling. I demaunde how manye pounds Flemiſhe I ſhal receiue in Andwerpe, for the ſayde 375 li. ſterling? Anſwere: ſay if 1 gyue 21 9/12, what will 375 gyue? Multiply and diuide, and you ſhall finde 4077 li. 16 ſ. 7 d. So many pounds Flemiſhe ſhall I receiue in Andwerpe for the ſayd 375 li. ſter in Andwerpe.

3. If I take vp money at Andwerp, after 19 ſ. 6 d. Flemiſhe, to pay for the ſame at London 20 whil. ſter. and when the day of payment is come, I am forced to returne the ſame, and to take vp money agayne in London to pay my bill of exchange, ſo that for 20 ſ. which I take vp heare, I muſt pay 19 ſ. 9 d. at Andwerpe, I demaunde whether I doe winne or looſe, and howe muche in or vpon the 100 li. of money? *Anſw.* Say, if 19 6/12 gyue 19 9/12, what will 100 gyue? multiply & diuide, and you ſhall finde

finde 8 $\frac{58}{79}$, the whiche beeing abated from 100, there will remayne 1 $\frac{21}{79}$. And so much doe I lose vpon the 100 pound of money.

4. If I take vp at London 20 shil. sterling to pay at Andwerpe 21 shil. 8 d. Flemishe, and when the day of payment is come, my Factor is constrained to take vp money agayne at Andwerpe, wherewith to paye the foresayd summe. And there hee doth receiue 22 shil. Flemishe, for the whiche I must pay 20 shil at London. Nowe I demaund whether I doe winne or loose and how much vpon the 100 pound of money after the rate? *Answere*: say if 21 $\frac{2}{3}$ giue $\frac{22}{1}$, what will $\frac{100}{1}$ giue multiply and diuide, & you shall fynde 101 $\frac{7}{23}$, from the whiche abate 100, & there will remayne 1 $\frac{1}{13}$: and so muche shall I gayne vpon the 100 pounde of money.

The exchaunge from London into Fraunce, is not like as it is into flaunders, but is deliuered by the french

crowne

crowne, which is worth 50 souse tour-
nois the peece.

And heere muste you note, that in Fraunce they make their accounte by Deniers Tournois, whereof 12 Deniers maketh 1 souse Tournois, and 20 souse Tournois maketh 1 li. Tournois, whiche they call a Liure or franc, and the Frenche Crowne is currante among Marchantes for 51 souse tournois, but by exchaunge it is otherwise, for they will deliuer but 50 souse, tournois, which is 2 li. 10 souse Tournois for a Crowne, and at suche price the Crowne, as the taker vp of money can agree with the deliuerer.

Example.

If I deliuer 340 li ster. heere in London, after 6 s. 4 d. sterling the crowne, to receiue at Rouan, or at Paris 50 Souse Tournois for euerye Crowne, I woulde know how many Lieures Tournois I shall receyue there for my 340 li. ster. Answere: lay

if

if 6 s. $\frac{1}{3}$ ster. do giue me 2 li. $\frac{1}{2}$ Tournois, what will $\frac{6800}{1}$ s. giue (which is ye 340 li. reduced into shillinges, then multiply and diuide, & you shall fynde 2684 Lieures. $\frac{4}{15}$, which is worth 4 souse, $\frac{4}{15}$ Tournois, and so muche shall I receiue in Rouan or Parris for my 340 li. sterling.

6. If I deliuer in Parris or Rouan or elsewhere in Fraunce, 1250 Liures Tournoise, at 50 souse Tournoys the Crowne: to receiue for euerye suche Crowne, 6 s. 3 d. sterling at London, I demaunde howe much sterling Money I shall receiue at London for my 1250 pounde Tournois: Aunswere: say, if 2 li. $\frac{1}{2}$ doe giue mee 6 s. $\frac{1}{4}$ what will $\frac{1250}{1}$ giue: Multiply and diuide, and you shall fynde 3125 s. sterling: which maketh 156 li. 5 shil. starling. And so many poundes shall I receyue at London for the sayde 1250 Liures Tournois, after 6 s. 3 d. for euerye Crowne of 50 soulze.

The

The 13. Chapter treateth of the *Rule of alligation or mixture.*

The Rule of Alligation is so named for that it reacheth to alligate or binde togither dyuers pertels of sundrye prices, and to know howe much you muste take of euery percell according to the numbers of the Question, the whiche rule is dystinct into two partes as followeth.

The fyrst part of the rule of Alligation, shewethe howe to make a mixture of diuers thinges beringe of sundrye prises, and of the same thinges so mixed, to knowe the common pryce of the sayd mixture.

Example.

1. A man woulde mixe 5 bushels of wheate at 2 s. 8 d. the Bushell with 9 bushels of Rye at 2 s. the bushell, and woulde know how muche the Bushell

so

so mixed doth stand him in, ẏ one with the other, *Answere* 2 for to knowe the same common pryce. You must multiply euery thing by his price, and adde all the productes together, the whiche you must diuide by the number of all the thinges that are to be mixed, and the quotient will answere to the question, as in the aforesayd example, I multiply 5 bushels by his price, that is to saye, 2 s. 8 d. and thereof commeth 13 s. 4 d. Likewise I multiplye 9 bushelles by 2 s. maketh 18 s. both these sūmes added togeather, doe make 31 s 4 d. the which I doe reduce into pence, and they make 376 pence, then I diuide 376 by 14, which is the number of all the bushels, and my quotient will be 26 pence and $\frac{6}{7}$, and so muche doth one Bushell of both the sortes of grayne stand him in.

2. If you haue two seuerall thinges whereof you woulde mixe equall portions togither, you muste adde their prices & take onely ẏ $\frac{1}{2}$, if you woulde myxe

mixe togethers equall portions of 3 thinges, you must take $\frac{1}{3}$ and of 4 the $\frac{1}{4}$, and so continuing, as by example, wheat of 2 s. 8 d. the bushell, and Rye of 2 s. the bushell, beeing mingled by equall portions, I adde 2 s. 8 d. and 2 s. togeather, and they make 4 s. 8 d. whereof the one $\frac{1}{2}$ is 2 s. 4 d. & so muche is the vallue of one bushell of suche a mixture. And if there were a portion of Barley at 20 d. then I muste adde 2 s. 8 d. 2 s. 20 pence together, & they make 6 s. 4 d. whereof the $\frac{1}{3}$ whiche is 2 s. 1 d. $\frac{1}{3}$ shoulde bee the price of one Bushell of that mixture.

3. A marchant hath 27 li. waight of large Cloues at 6 s. the li. 15 li. of the middle sorte, at 2 s. 6 d. the li. And 10 li. of Fuste at 2 s. 2 d. the li. when all the same are mixed togeather, I would knowe howe much the pounde is worth *Answere*: you muste multiplye euery droog by his price, and then diuyde the totall summe of the productes, by the whole waight of the droogs, and you

shall finde 51 d. $\frac{1}{10}$ and so much is the li. of that mixture worth.

27 at 6 s. 0 d.	162
15 at 2 s. 6 d.	$37\frac{1}{2}$.
10 at 2 s. 2 d.	$21\frac{1}{2}$.
52	$221\frac{1}{2}$.

4. And if you woulde mixe $\frac{1}{2}$ large cloues, $\frac{1}{3}$ of middle, and $\frac{1}{4}$ of Fuste, and you woulde knowe howe muche the pounde waight were worthe, you must take a nũber, which conteyneth those partes, as for exemple, 12 whereof the $\frac{1}{2}$ whiche is 6, shall signify so may li. of large cloues, the $\frac{1}{3}$ which is 4, shall be so many li. of middle, and the $\frac{1}{4}$ whiche is 3, shall bee so many li. of Fuste: then afterwardes you must multiplye euery droog by his price, and diuyde the total summe of al the products with ỹ whole summe of the droogs, & you shall finde 4 s. $\frac{1}{10}$. And so much is 1 li. waight of the mixture.

6.	at 6 s.	0 d.	36
4.	at 2 s.	6 d.	10
3.	at 2 s.	2 d.	06 1/2.
13.			52 1/2.

5. And if you woulde make 100 pound waight of such a mixture, you shall worke by the rule of company, and you shall finde 46 li $\frac{3}{13}$ of large cloues, 30 li. $\frac{10}{13}$ of middle, and 23 $\frac{1}{13}$ of Fust.

6	13.	100	6 Ans.	46 3/13.
4			4 Ans.	30 10/13.
3			3 Ans.	23 1/13.
13				100

6. A Goldsmith hath 8 li. waighte of siluer billion of 7 ounces fine, more 15 li. of 8 ounces $\frac{1}{2}$ fine, & 13 li. waighte of 10 ounces fine, and he will melte all these together, and make of them one masse. The question is to knowe of what fineneſſe the pounde waighte is?

Answere you muſt multiply the number of the waightes of euery Billion, by his fineneſs, & thereof will come the

ounces and partes of ounces fyne, the which you muſt adde together and they will make 313 ounces ½ of fine, the ſame you muſt diuide by 36 whiche is the whole ſumme of the pounde waight of Billion, and you ſhall finde 8 ounces and $\frac{5}{7}\frac{1}{2}$ remayning, which $\frac{1}{7}\frac{1}{2}$ partes of an ounce, is worth 14 peny waighte, & 4 graynes, and ſo muche is the pounde waight of this mixture worth.

8 lib.	at 7 onz.	is	55
15.	at 8 onz. ½.	is	127 ½.
12.	at 10 onz.	is	130
36.			313 ½.

7. A Goldſmith hath three ſortes of Siluer billion, that is to ſaye 5 li. 7 ounces 10 peny waight, at 7 ounces ½ fine: 12 li. 5 ounces, at 6 ounces ½ fine: And 4 li. at 9 ounces fine. All the which he will melt into one maſſe. The queſtion is to know, of what fineneſſe the pound waight of that mixture ſhal be? *Anſwere:* you muſt multiply euery Billion by his fineneſs, as afore. And adde together

together all the productes and they doe amount to 155 li. $\frac{37}{48}$. Then adde all the waightes of the Billions together into one summe, and they make 21 li. $\frac{7}{8}$ & diuide then 155 $\frac{37}{48}$, by 21 $\frac{7}{8}$, & your quotient 7 ounc. and $\frac{1016}{8400}$ remayning, the which $\frac{1016}{8400}$ beeing broughte into penye waightes or graynes, do gayne 2 peny waighte, 10 graynes, $\frac{2}{35}$ of a grayne fine. So you may perceiue that the same mixture is of 7 ounc. 2 d. 10 graynes, and $\frac{2}{35}$ of a grayne fyne, the pound waight.

And heere is to be noted, that the reckening of the waightes for Syluer is thus as followeth that is to say.

1 li. of Troye waighte maketh 12 ounces.

1 Ounce is diuided in 20 pennies waight.

1 Penie waight is distributed into 24 graynes.

1 grayne into 20 smaller partes. &c.

And the reckening for Gold is thus.

1 Dunce of fine golde without any alloy, is imagined to be 24 karetts.

1 karet is diuided into 4 graynes.

1 Grayne is parted into two halfe graynes, or 4 quarters of a grayne. &c.

And so into other smaller partes.

8. But if the sayd Goldsmith woulde put 5 li. waighte of Copper with the sayde Billions, and you would knowe of what finenesse it is, then must you ad the same 5 li. with the 21 li. $\frac{7}{8}$, and it maketh 26 $\frac{7}{8}$ Then diuide the aforesayd 155 li. $\frac{37}{48}$, by 26 li. $\frac{7}{8}$, and you shall finde 5 ounces fine, and $\frac{8216}{10320}$ remayning, the whiche $\frac{8216}{10320}$ is worth 15 penny waight, 22 graynes, and $\frac{6}{43}$ And of that finenesse wil the same masse be.

9. A Goldesmith hath melted 12 li. waight, and 5 Dunces of Golde billion being of 18 karets fine, with 4 li. waight, 4 ounces and $\frac{1}{2}$, at 21 karets fine, I demaunde of what finenesse is 1 li. waight of the same masse. Ans.

you

you muſte multiply the waighte (by the karets fyne) of eche ſorte, & adde the products togeather, the ſame you muſt diuide by the whole ſumme of all the waighte added togeather, and youre quotient will ſhew you of what fineneſs the ſame is of, as in the former exampie, I doe multiply 12 li. & 5 ounces by 18 karets, and thereof commeth 223 karetts $\frac{1}{2}$. Likewiſe I doe multiplye 4 li. waight, 4 ounces $\frac{1}{12}$, by 21 karets and thereof commeth 91 karettes $\frac{7}{8}$ theſe two ſummes of karettes I doe adde togeather, and they make 315 karets $\frac{1}{8}$. Then I doe adde 12 li. waight 5 ounc. and 4 li. waight, 4 ounces and $\frac{1}{2}$ together, and they make 16 li. 9 ounc $\frac{1}{2}$, the which 9 ounces $\frac{1}{2}$ are $\frac{12}{24}$ partes of a pound: and therefore I diuyde 315 $\frac{1}{8}$ by 16 li. $\frac{12}{24}$, and thereof commeth 18 karetts & $\frac{210}{284}$ remayning, whiche fraction is 3 graynes, and $\frac{11}{401}$ partes of a grayne. And of that fineneſſe is 1 li. waight of the ſayd maſſe.

A Goldeſmith hath melted 10 li. waight, 7 ounces and $\frac{1}{2}$ of 20 karettes

and $\frac{2}{3}$ fine. And 8 li. waighte, 2 ounces and $\frac{5}{6}$ partes of 23 karets fyne, with 15 li. waight, 1 ounce of Siluer. The question is of what finesse is the pound waight of the sayde masse? *Answere*: you must multiply the waighte of euerye sorte of Golde billion by his alloy, that is to say by his finesse, and adde all the productes togeather: and you shall finde 340 karets $\frac{25}{432}$, then adde the waighte of the two sortes of Golde billion, with the waight of the Siluer togethers, and thereof will come 33 li. 11 ounces $\frac{5}{24}$, the which 11 ounces $\frac{5}{24}$ is $\frac{269}{288}$ of a pound waighte, then diuide the sayde 340 karetts, $\frac{25}{432}$ partes by 33 poundes $\frac{269}{288}$, and you shall finde 10 karettes $\frac{4205}{203871}$. And of the same finnesse shall the pound waight of that masse of Golde be.

The seconde part of the rule of alligation.

1. A Goldsmith hath 4 sortes of golde The first is worth 30 crownes, the pound waight, the seconde is worth 36.

crownes

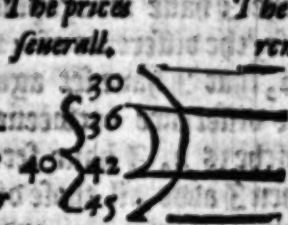
crownes, and the thirde is worth 42 crownes, and the fourth is worth 45 crownes, and of their 4 sortes he will make a Scepter of 6 pounde waight, which shall be worth 40 crownes the pounde. I demaunde howe muche he must take of euery sort. *Answere*, first you must set downe the numbers whereof you wil make the alligation (which are 30. 36. 42. and 45. orderly the one vnder the other, after the same maner, as if you would adde them together: and the common number where vnto you will reduce them, you shall set on the left hand, which common number in this Example is 40. Then marke which of the said foure numbers, are lesser then that common number, and which of them be greater, and with a drought of your pen, euermore linke two numbers together, so that the one be lesser then that common number, & the other greater then it, for two greater, nor two smaller numbers may not be linked together, for they will eyther be lesser, or els greater then the com-

common number: but one greater nũber, and one ſmaller may be ſo mixed that they will make the common number. And two greater or two ſmaller numbers, can neuer make the common number in due order, as heereafter ſhall appeare.

After ẏ you haue thus linked them, then marke howe muche eache of the leſſer numbers is ſmaller then ẏ common number, and that difference you ſhall ſet againſt the greater numbers which be linked with thoſe ſmaller, eache of them with his matche ſtilt on ẏ right hand. And likwiſe you muſt ſet the exceſſe of the greater numbers againſte the leſſer which be combined with them. Then ſhall you adde all thoſe differences into one ſumme; which ſhall be the firſt number in the rule of three, and the ſecond number ſhall be the whole maſſye peece, ẏ you will haue of all the perticulers, which in his example was preſuppoſed to be 60 li. Then the third ſumme ſhalbe each difference by it ſelfe, and by them

ſhall

shal you finde oute the fourth number, declaring the iuste portion that you shall take of euerye particuler in that mixture, as now by the former example, I will make it more playne.



21. 6. 5. || 21. 6. 2.

21. 6. 4. || 21. 6. 10.

Heere in this former example, you see that I haue set downe the seuerall prices, whiche be 30, 36, 42, 45, and haue linked togeather 30 with 45, and 36, with 42. The common price 40, I haue sette on the leste side as before is declared, and the difference of it frō euery

euery ſeuerall price, I haue ſet on the right hande, againſt that ſumme with the which it is linked. So the difference of 30 from 40 is 10, whiche I ſet againſt 35 that he is linked withal, and the difference of 45 aboue 40, is 5, whiche I haue ſet againſt 30. So like wiſe, the difference of 42, aboue 40, is 2, that I haue ſet againſt 36. And the difference betweene 36 and 40, whiche is 4, I haue ſet againſte 42. Then I adde all thoſe differences together, namely 5, 2, 4, and 10, and they make 21, whiche I make the firſt number in the Rule of three, and 6 li. whiche is the waight of the Scepter of Golde the ſeconde number, and the third number ſhall be euery particular difference for euery ſeuerall working. Then worke by the rule of three, ſaying, if 21 (which is all the differences added together) doo geue me 6 pound waighte, whiche is the waighte of the Scepter, what ſhall 5 geue, which is the firſt difference?

I multiply and diuide, and I finde 1

li. waight $\frac{1}{7}$, so muche must I haue of ỹ first price then I do in like maner with the rest, and I finde $\frac{2}{7}$ of a li waighte of the second price, 1 li. $\frac{1}{7}$ of ỹ third price and 2 li. $\frac{4}{7}$ of the fourth. the whiche 4 summes beeing added together, doe make 6 li. which is the whole waighte of the Scepter that I would haue, and nowe to proove if the prices doe agree you shall doe thus: First multiply this totall summe 6 by the common price 40, and it will make 240 Crownes, which you shall keepe by it selfe. And afterwarde multiplye euerye seuerall summe of waighte by the price belonging to the same waighte, and if that summe do agree with the first that you kepe by it self, then is your worke well done, as here 1 li. $\frac{1}{7}$, is the waight of ỹ sort of Golde which is of 30 Crownes price. Therefore multiplye 30 by 1 li. $\frac{1}{7}$, and it maketh 40 crownes $\frac{5}{7}$, whiche you must set downe. Then multiply $\frac{2}{7}$ (whiche is the waighte of the seconde sorte of Golde) by 36, whiche is the price of the same, and thereof commeth

20

20 crownes $\frac{4}{7}$: so agayne 1 li. $\frac{1}{7}$, multiplyed by 42 crownes, whiche is the thirde price, doth make 48 Crownes. And last of all 2 li. $\frac{5}{7}$, multiplyed by 45 maketh 128 crownes $\frac{5}{7}$. All these being added togeather, doe make 240 crownes agreeable to the former sum of 40, multiplyed by 6. And thus I maye affyrme that his worke is well done.

2. A Tauerner hath foure sortes of wine, of foure seuerall prices, the fyrst of 8 pence the Gallonde, the seconde of 10 pence the Gallonde, the third of 15 pence, and the fourth of 18 pence. And he will mixe all these sortes togeather so that the Gallonde shall be worth but 12 pence. I demaunde howe manye Gallonds hee must take of euerye sorte *Answere*: firste suppose the puncheon to holde some certaynne measure, as to conteyne 84 gallondes, and then the forme will bee after this sorte, as you see hereafter following.

If 15 *do giue* 18.

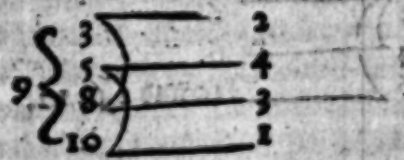
What will 3. *giue* : 16$\frac{4}{5}$ *of the first.*
What will 6. 33$\frac{1}{5}$ *of the second.*
What will 4. *They* 22$\frac{2}{5}$ *of the thyrd.*
What will 2. *make* 11$\frac{1}{5}$ *of the fourth.*
84.

3. A mint mayster hath 4 sortes of siluer Billion, of these finesse following. The first is of 3 ounces fine, the second of 5 ounces fine, the thyrde of 8 ounces fine, and the fourth of 10 Dunces fine. And of all these 4 sorts hee woulde make another sort, that shoulde bee but of 6 oun. fine. The question is to know what portion he must take of euerye of the sayd billions. *Answere*: set downe the particuler fineneſſe the one vnder ỹ other, namely, 3, 5, 8, and 10, and set 6 which

which is the common finesse, before them towardes your lefte hande, as here you may see.

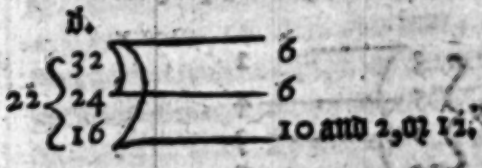
Then put the difference of 3 from 6 right agaynst 10, and the difference of 6 from 10, which is 4, right agaynst 3 Likewise ỹ differẽce of 5 from 6, which is 1, right against 8: and the difference of 6 from 8, which is 2, right agaynste 5. This done, you shall conclude, that for euery 4 pound waighte that hee taketh of the billion of 3 ounces fine, hee must take 2 li. of the billion of 5 ounces fine, and 1 li. waight of the billion of 8 ounces fine, and 3 li. waight of that which is of 10 ounces fine. Or else if you please, adde 4, 2, 1, and 3, together and they make 10, which shall bee the denominator, of euery of the portions that

that is to saye you shall take $\frac{4}{10}$ of the billion of 3 ounces fine, $\frac{2}{10}$ of ẏ which is of 5 ounc fine $\frac{1}{10}$, of that of 8 ounces fine, and $\frac{1}{10}$ of that which is of 10 ounces fine, and so of all suche like. And if you would make 60 li. waight of suche a mixture, you must adde 4, 2, 1, and 3, together, which maketh 10, and then worke by the rule of company, saying, if 10 li. giue 60 li. what will 4 giue? and so lykewise what will 2 giue &c. This forme may be varyed, by conbining the particular valeures after this maner, as here you doe see, and as in the other example it is playne.



4. Somtimes the valeur doeth change his difference, and is linked vnto dyuers for to represent the portion that is to be taken of euery thing, as by ex-

ample. A marchãt hath wheat of 2 s. 8 d. the bushell. Rie of 2 s. and barley of 16 d. the bushell, and hee will make a mixture of these sorts which shall stãd him but in 22 pence the bushell. It is demaunded howe muche hee may take of euery sorte of the sayd graynes? *Ans.* Put the differences of 22 from 32, & 24 right agaynst the 16. And likewise the difference of 16 from 22 right against 32, and agaynst 24, and you shall finde for 6 bushels y he taketh of wheat, he must take 6 bushels of Rye, and 12 bushels of Barley.



5. A Mint Maister hath billion of 9 ounces 10 penye waight fine, and of the same he would make money, which should be but of 6 ounc. fine, wherefore it behoueth him to melte Copper

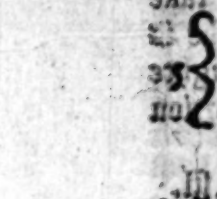
therewith

therewith, which is valued at 0 penie waighte of fine. The Question is to knowe how muche siluer and copper he muste mixe togeather? After that you haue put downe 9 ounc. $\frac{1}{2}$ for the valeur of the siluer, and righte vnder the same, 0 for the copper you muste take the difference of 6 from $9\frac{1}{2}$, whiche is $3\frac{1}{2}$, and place the same summe righte agaynst the 0. for to signify the portion of copper: y he must take: And the difference of 0, from 6, is 6: the same you muste set righte agaynste $9\frac{1}{2}$, whiche shall represente the portion of siluer that he must take. And thus you see that for 6 li. of siluer that hee taketh, he must take 3 li. $\frac{1}{2}$ of Copper to make the sayde money at 6 Ounces fine.

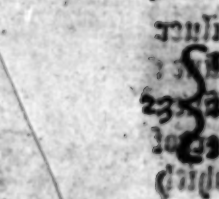
$$6\left\{\begin{array}{l} 9\frac{1}{2} \\ 0 \end{array}\right. \begin{array}{l} \text{6 li. sil.} \\ \text{3 li. } \frac{1}{2} \text{ cop} \end{array}$$

And if he had three sortes of Siluer billion, that is to say of 6 ounces fine: of 7 ounces fine, and of 9 ounces fine: and hee woulde make money thereof

which ſhould be but of 5 ounces fine, it behoueth him to mixe copper therewith, and this forme following doeth ſhewe howe the ſame muſt bee commyxed, and likewiſe howe muche hee muſt take of euery ſorte.

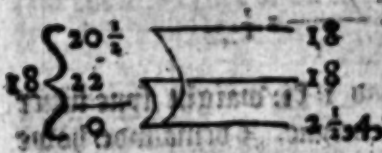


6. Likewyſe a Mynte maiſter hath Billion of Golde, at 19 karetes fyne, ſome at 22 karettes fyne, ſome at 24 karettes, whiche is full fyne wythout corruption, and hee will make coyne thereof, which ſhall bee of 23 karettes fine, it is demaunded howe muche hee muſt take of euery ſorte: Anſwere: make your alligation as this forme herevnder ſheweth.



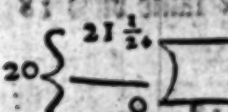
Note

Wore, the sayde mayster hath Golde of 20 karets $\frac{1}{2}$ fine, and of 22 karettes fine, and he will allaye the same to 18 karettes fine, and for to doe the same, it is conuenient for him to mixe syluer therewith, whiche is esteemed a 0 karets fine, but proceeding according to this Rule, he shall fynde that for 18 pounde waighte or other portions that he taketh of the two sorts of Billion of golde, he must take 6 li. weighte, and $\frac{1}{2}$ of syluer to allaye the same vnto 18 karets fine.



7. Agayne, the sayd mayster hath 100 pound waight of golde at 22 karettes fine, and 20 pounde waight at 19 karets fine. The which he will allaye to 20 karets fine. The question is whether he ought to mixe any syluer with the same, yea or no, and howe muche?

Answere. you must consider (by ỳ first part of the rule of Alligation) the alloy of the 100 li. and of the 20 li. being melted togeather, and you shal finde that the same is of 21 ½ karettes fine, & therefore for as much as the same is yet of a better fineneſſe then he would haue it, he muſt therefore mixe siluer therewith, that is to say for 20 poind waighte portions of Gold, he must take therto 1 li. ½ of siluer.



8. If he had 1 li. waighe fyne siluer of 12 ounces fyne. I demaunde howe muche copper hee muste mixe with the same, to allay it vnto 11 ounces ½ fine, that is to saye to 11 ounces 5 penuye waighte fyne, make your alligation as before is taught, then deuyde the portion of Copper, by the portion of fyne and you shall fynde ½. whiche being abreuiated, is —. And thus to euerye li.

waighe

waight of siluer, you must take $\frac{1}{11}$ of a li. of copper, and for euery 11 pounde $\frac{1}{12}$ of siluer, you must take $\frac{1}{4}$ of a li. of copper. And so is to be done with the same, in case that it were of any other alloy.

9. A Mayster hath 1 li. of fine gold of 24 karettes fine, the which he would allay to 22 karets fine. The questyon is to know howe much siluer must bee mixed with the same, that it may bee of ỳ fineneſſe of 22 karets as before, And. take the difference of 22 to 24, whiche is 2. Then diuide 2 by 22, whiche you can not, for they are $\frac{2}{22}$, but abbreuie them, and it is $\frac{1}{11}$. And so much siluer muste bee mixed with 1 li. waighte of fine golde that the same may be of 22 karets fine.

10. A Goldsmith hath 1 li. waight of siluer billion of 7 ounces fine, it is demaunded how muche fine siluer, hee must put to the same, that being molten together, it maye bee of 10 ounces

fine? Anſwer, make your Alligation of 7, and 12 vnto 10, and then diuide the portion of the fine ſiluer by the portion of ſiluer billion, and you ſhall finde 1 $\frac{1}{2}$: and thus to 1 pound waighte of 7 ounces fyne, you muſt take 1 li. $\frac{1}{2}$ of fyne ſiluer of 12 ounces fyne, to make the ſame of 10 ounces fyne.

11. A Marchante hath giuen order vnto his Factor to imploye him 83 li. 6 s̄ 8 d. ſterling in 5 ſortes of ſpices, ꝑ is to ſay, in Nutmegs of 80 d. the poūd Cloues at 76 d. the pounde, Synamon at 52 d. the pound, Ginger at 34 d. the pounde, and pepper at 30 d. the pounde But hee hath not appoynted him the qnantitie or portion which he ſhoulde buy of euery ſorte, neyther yet of al the ſorts together, the queſtion is to know how muche the factor muſt buy of euery ſort to haue of ech of thē like quantity, Anſwere, you muſte adde 80, 76, 52 34, and 30 together, and they make 272. Then you muſt diuide 83 li. 6 ſhi. 8 d. being reduced into pence, name-

ly

ly 20000 d. by 272, & thereof commeth 73 li. $\frac{5}{17}$. And so many poundes muste be buy of euery sorte of the sayd spices.

12 But in case he woulde not haue so many poundes of the one sorte, as he would haue of the other, then you must take another middell valeur, betweene the sayd particulers, as for example, let the meane number bee 50 d. Then reduce the sayde 83 li. 6 s. 8 d. into pence, as ỳ other prices are, & they doe make 20000 pence, the same you must diuide by 50 pence, whiche is the meane or common price, and therof wil come 400 li. And so manye poundes must he haue of all the sortes togeather Then if you will knowe howe manye poundes he must haue of euerye sorte, you muste sette downe your particuler prices, after the middle valure, that is to say after 50 d. as hereafter followeth, And then worke by the rule of company, and you shall fynde.

50	80	20
	76	16
	52	16
	34	26 & 2, all is 28.
	30	30
		110

110 giue 400, what

20: Ans.	$72\frac{8}{11}$.
16: Ans.	$58\frac{2}{11}$.
16: Ans.	$58\frac{2}{11}$.
28: Ans.	$101\frac{9}{11}$.
30: Ans.	$109\frac{1}{11}$.
	400

The 14 Chapter treateth of the *Rule of falshoode, or false positions.*

THe Rule of falsehoode is so named not for that it teacheth anye deceyte or falsehoode, but that by fayned numbers taken at all aduentures, it teacheth to finde out the true number that is demaunded, and this of all the vulgar Rules which are in practise) is ye most

maste excellente this Rule hath two partes, the one is of one false position alone, the other is of two positions, as hereafter shall appeare.

Those questyons whiche are done by false positions, haue their operations in a manner lyke vnto that of the rule of three: but only that in the rule of three wee haue three numbers knowen, and heare in this rule, wee haue but 1 number that commeth in vse to worke by, vnto the likenes whereof we must deuise two other numbers: one multiplying, and the other diuyding, as by example.

1. I haue deliuered to a Banker, a certayne summe of poundes in money, to haue of him by the yeare simply, fyue li. vpon the 100 li. and at the ende of 10 yeares he payde me 500 li. for all, both principall and gayne. I demaund howe much was the principall summe that I deliuered him at the fyrst? Heere you see that there are diuers termes but the cheefe to worke withall is 500 li.

li. which commeth of the other numbers that is to saye, of 10, and 100 for of them is composed or made the tenor of the question, the practise whereof is thus.

Let vs fayne a number at pleasure, and with the same let vs make oure discourse, euen as though it were the principall summe that wee seeke for. As by example. Suppose that I deliuered him at the fyrst 200 li. ẏ which were worth to mee in ten yeares, 120, li. after the rate of 6 li. vpon the 100 li. Then 120 li. added with 200 li. do make but 320 li. and I must haue 500 li. Thus you see that I haue three termes for the rule of three, the one whiche shall contayne the Questyon, the other two whiche I haue formed artificially, which are 200: and 320, in suche sorte that 320 oughte to haue such proportion to 200, as 500 hath vnto the number that I seeke: that is to say vnto the true principall summe then muste I haue recourse vnto the Rule of three after this sorte, sayinge,

If

If 320 li. be come of 200 li. of howe much shall come 500 li? I doo multiply 500 by 200, and they are 10000, the which I must divide by 320 li. and thereof commeth 31 li. ½, whiche is the summe that I deliuered at the first. And thus this rule hath some congruence with the double rule of three.

2. I haue a Cesterne with 3 vnequall cockes, conteyning 60 pipes of water: And if the greatest cocke be opened, the water will vayne cleane in 1 howre, at ye seconde it will auoide in 2 howres, and at the thirde it will require 3 howres. Nowe I demaunde in what space it will auoyde, all the cockes being set open? Answere. Suppose that it will auoyde in halfe an houre, that is to say, in 30 minutes. Then must there auoyde at the first cocke the ½, which is 30 pipes: and by the seconde cocke the ¼ whiche is 15 pipes, and by the thirde cocke the ⅓, that is 10 pipes: all the whiche summes being added together, doo make 55 pipes: but it

shoulde be 60 pypes. Therefore say by the rule of three, if 55 pypes doe voyde in 30 minutes, in howe many minutes will 60 pipes voyde: multiply and diuide, and you shal finde 32 minutes $\frac{5}{11}$, the which $\frac{5}{11}$ beeing abbreuiated are $\frac{1}{2}$ of a minute, and in that space will the water voyde if all the cocks be set open.

Of the rule of two falle positions.

THE summe of this Rule of two falle positions is thus, When anye question is proponed appertayning to this rule. Firste you must imagine any number at your pleasure, whiche you shall name the firste position, and with ỳ same shall you worke in steede of the true number, as the question doth importe, and if you do see that you haue missed of the true number that you doe seeke: Then is the falle number of the worke eyther to greate or to litle, the whiche number, you shall note with the signe of more or lesse for

for thatis the first error in the which you haue fayled, the whiche signes of more, & lesse, shall be noted with these figures ×, —, This Figure ×, betokeneth more: and this plaine line —, signifieth lesse: that is to saye the one signifieth to muche, and the other to little: then you must begin againe, and take another number, which shalbe the seconde position, and worke by the question as before, yf you haue fayled agayne, note the excesse or wante, for yt is the second error. Then shall you multiply the first position by ỹ seconde error crossewise, and agayne the second position by the firste error, (and this muste alwayes bee obserued) and you must keepe the two products, then if the signes be both like that is to saye, either both to muche, or both to little, you shall abate the lesser product from the greater, and likewise you shal subtract the lesser error from the greater, and by the remayne of those errors, you shall diuide the residue of the products, the quotient shall be the true

number

number that you seke. But if the two signes be vnlike, that is to say the one to muche, and the other to little, then you shall add those productes together, and likewise you must adde both the errors together, and by the summe of those errors, diuide the totall summe of both the productes: ẏ quotient shalbe the true number that you do seeke, and this is the whole rule, as by these examples followinge it will appeare more playne.

Example.

3. A man lyinge at the poynte of deeth saide ẏ he had in a certaine Coffer 100 Duckets, the which he bequeched to three of his friends by him named after this sorte. The firste muste haue a certaine portion. The seconde muste haue twise so many as the firste abating 8 Duckets: and the third must haue three tymes so many as the firste lesse by 15 Duckets. Now I demaund how many euery of them muste haue

Ans.

Answere: first I doe imagine ỳ the first man had 30 Duckets, then by the order of the question, the seconde should haue 52, and the third 75. These three summes beeing added togeather doe make 157, and I should haue but 100 so that this fyrste erroꝛ is to muche by 57, then I note apart the fyrst position 30, with his erroꝛ 57 to muche after this soꝛte 30, ✕ 57. Therfoꝛe I pꝛosecute my woꝛke, and I suppose that the first had 24, thē by the oꝛder of the question, the seconde shoulde haue 40, and the thirde 57: these three summes being added togeather doe make 121 and I muste haue but 100, so the seconde erroꝛ is to muche by 21. Therefoꝛe I note 24 ✕ 21, vnder the 30, ✕ 57, which was my fyrst position which the erroꝛ as you maye see in the woꝛke on the nexte syde following.

Then I multiplye crossewayes 30 (whiche is the fyrste position) by 21 whiche is the seconde erroꝛ and thereof commeth 630. Likewise I multiply 24, (whiche is the seconde position)

by 57 which is the first error, and I finde 1368: then because the signes of the errors are bothe lyke: that is to saye, boothe to muche, I must therfore subtract 630, frō 1368, add there wilremain 738 which is the diuidende: agayne I muste subtract ẏ lesser errour from the greater, that is to say, 21, out of 57, & there will remayne 36, which shall be my diuisor. This done I diuide 738 by 36, and the quotient will be 20, $\frac{1}{2}$.

630.

30. × 57.

24. × 21.

1368. 36.

630.

738.

	11.
	738.
20 $\frac{1}{2}$.	366. (20. $\frac{1}{2}$.
33.	3
46 $\frac{1}{2}$.	
100.	

The

The whiche 20 $\frac{1}{2}$, is the iuste number of the Duckets that the firste man had for his parte, so consequently the seconde man had 33 Duckets, and the thirde 46 $\frac{1}{2}$, as by the working afore may appeare.

The like number will also appeare, in case the errors were both to little, as in making the two positions by 18, and 20 & you shal find that ẏ twoerrors wilbeboth to litle, ẏ firste will be to little by 15, and the second to little by 3, as by perusingthis work, you shall well perceiue.

52.
18.——15.

20——3.

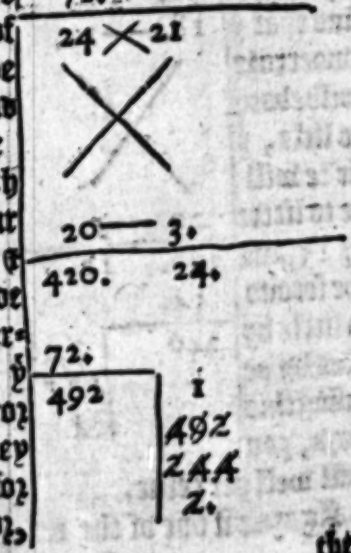
300. 12.
54.

246 | ~~2~~46 (20. $\frac{1}{2}$.
| ~~1~~22
| ~~1~~

Agayne if one of the errors were to

muche, and the other to little, yet you shall haue the true number as beefore. As if the two positions were 24, and 20, you shall fynde that the fyrst error will be 21 to muche, and the seconde will be 3 to little. Therefore multiply 24 by 3 crosselwayes, thereof commeth 72.

Likewise multiply 20 by 21, ỹ product will be 420. These two sumes 72, and 420, you shall adde together, bicause the signes of the errors be vnlike, and they make 492, ỹ which shall be your diuidende, & agayne, adde the lesser error 3, with ỹ greter error 21, and they make 24, for your diuisor,



then

then diuide 492 by 24, the quotient will be $20\frac{1}{2}$: as before dothe playnly appeare.

And now bycause you shall not forget this parte of the rule, learne this briefe remembrance folowing.

The signs both like, subtractiō do require.
And vnlike signes, addition will desire.

The meaning whereof is thus, if both the errors haue like signes, then muste the diuidende and the diuisor be made by subtraction, as is taught before, and if those signes be vnlike, then must you by addition gather the diuidende, and the diuisor, as I haue done in this last example.

Another Example.

4. A man hath two siluer cuppes of vnequall waight, hauing to them both but one couer, the waight wherof is 5 ounces, if the couer be put to the lesser cuppe, it will be in double proportion

vnto the waighte of the greater, and the Couer beeing put to the greater cuppe, it will bee in triple proportion, vnto the waighte of the lesser. I demaunde what was the waighte of euery cuppe? Answere, suppose that the lesser cuppe did weigh 7 ounces, then with the couer it muste weigh 12 ounces, and this waighte shoulde bee in double proportion vnto the greater, therefore the greater muste weigh but 6 Ounces, adde vnto it 5 ounces for the Couer all will be 11 ounces, but it shoulde bee 21, for to haue it in triple proportion vnto 7, which representeth the waighte of the lesser cuppe. So that this

105.

7. — 10.

9. — 15.

90. 15.

105.

90. 15. (3 ounces

15. 8.

this first erroz is to little by 10, which you shall note after 7 in this sozte, 7, —— 10.

After you shall suppose some other number, as 9, & make the like wozke as before, so you shall finde 15 to litle foz the seconde erroz, which you shall put behind 9 with the signe lesse thus —— 15, and then wozke with the rest as a boue is saide, and you shall finde that the lesser cuppe waighed three ounces, and consequently the greater foure ounces.

5. One man demaunded of another in a mozning, what a clok it was, ye other made him this answere, yf you doo adde (sayth hee) the $\frac{1}{2}$ of the howers which by past since mydnight with the $\frac{1}{3}$ of the howers which are to come vntill noone, you shall haue the iust howr, that is to saye, you shall know what a cloke it was Answere: Suppose that it was 4 a cloke in the mozning, so shoulde there remane 8 vntill noone, then I take the $\frac{1}{2}$ of 4

which is 1, & the $\frac{2}{3}$ of 8 which is 5 $\frac{1}{3}$, and I adde them together, so I finde 6 $\frac{1}{3}$, and I supposed but 4, therfore this first error is to much by 2 $\frac{1}{3}$, which I note after my position, thus 4 $\times$ 2 $\frac{1}{3}$ then agayne I suppose an other number, that is to say 9: so should remayne but 3 howers vntill noone. I take the $\frac{1}{4}$ of 9 and the $\frac{2}{3}$ of 3, which is 2 $\frac{1}{4}$ & 2: these I adde together, and they make 4 $\frac{1}{4}$: but I supposed that it was 9 therfore the seconde error is 4 $\frac{3}{4}$ to little, whiche I note behinde my Position thus. 9 — 4 $\frac{3}{4}$.

And then I multiply crossewise, as before is taught, & by cause the signes of ye errors are vnlike, that is to saye, the one to much, and the other to little, therfore in this worke I must adde the productes, and they

19	
4 $\times$ 2 $\frac{1}{3}$.	
9 — 4 $\frac{3}{4}$.	
21	7 $\frac{1}{12}$.
19	
40	

they wil be 40. Likewise I must adde the errors, and they be $7\frac{1}{12}$. Then I diuide 40 by $7\frac{1}{12}$, and therof commeth 5 howers $\frac{21}{37}$, and that hower it was in the morning.

The 15. chapter treateth of diuers *questions extraordinary, euery one of them containing a generall rule for suche lyke examples.*

¶ Fiue men deuising of their ages. The first said to the others, y be was 120 yeres of age: The second said if my yeres were doubled, then should I haue so many yeres more then the first man, as the first hath now more then I haue: The thirde saide in like maner, if my yeres were tripled. The fourth said if my yeres were quadruple, that is to say multiply by 4: the fifthe saide that his yeres were quintupled, that is to say multiplied by 5, that they should each of the haue so many yeres more then the first man

as

as he hath nowe more then euery one of them. The question is to know, how olde euery of the other 4 men were? Answere, you must take the numbers which are neerest collaterals, in naturall order vnto 2, 3, 4, and 5, by reason of dupling, tripling, &c. And the greater of euery of the saide numbers collaterals, must be your Denominator, to the lesser number, As thus, the next collaterall numbers vnto 2, are 1 & 3, which is $\frac{1}{3}$. Likwise ỳ next collateral nũbers to 3 are 3, and 4 which is $\frac{3}{4}$, and so for 4, are 2 & 5, which are $\frac{2}{5}$, and for 5 are 4, and 6, which be $\frac{4}{6}$. Then if you will knowe the seconde mans age, you must adde vnto 120, ỳ $\frac{1}{3}$, of it self which is 40, all is 160, the same you must diuide by 2, and thereof commeth, 80 yeares so olde was the second man. And for to knowe the age of the thirde man: you must adde vnto 120 his owne $\frac{1}{2}$, that is to say his $\frac{1}{2}$ which is 60: And they make 180. The saide summe you must diuide by 3, & thereof cũmeth 60 yeeres

for

for the thirde mans age. And after the same manner you shall finde that the fourth man had 43 yeres, and the fifth had fortie yeres. The proofe is very easie.

2. A man hauing his eye sight somewhat altered, began to tell and recken a certayne number of birdes to be in all 18. His Companion that had a clearer sight, beholding wel the birds, answered him, that there were not 18, but saide he, if ther were twise so many more as there are, there should be as many more abou 18, as ther be nowe lesse then 18. The question is to knowe, how many birdes there were in all? *Answere.* you muste adde vnto 18 his $\frac{1}{2}$, that is to say his $\frac{1}{2}$, and thereof will come 27, the whiche you shall diuide by 3, and thereof commeth 9. And so many birdes there were in all.

3. A Draper hath bought 24 sorting clothes, and he hath solde 100 pounds worth

worthe the ſame clothes, vppon the whiche he hath gayned as muche as 1 clothe did coſte him, I demaunde what one of the ſayde clothes did coſte him: *Anſwere:* you muſt adde 1 vnto 24, and they make 25. Then diuide 100 by 25, and therof will come 4 li and ſo much did one cloth coſt him.

4. A mayde carieng egges vnto the market, and it happened a merrye fellowe to meete her, who began to ieſt with her in ſuche ſorte, that he ouerthrewe her Baſket, and brake all her egges: the mayde beeing muche diſpleſed with him for breaking of the ſame, ſayde very earneſtly vnto him, that he ſhould pay for them, the man conſidering with him ſelfe, that by his folly they were broken, anſwered the maid, that he wolde pay her for them, and therfore he demaunded of her what nũber ſhe had. The ſilly poore wenche that coulde not well recken, ſayde vnto him, that ſhe coulde not well tell him, but ſayde ſhe, when I did put the

into

into my Basket by 2, and by 2, there remayned 1 egge: and when I counted them by 3 and by 3, there remaynes 1: and when I did recken them by 4 and by 4, there remayned still 1: but when I did counte them by 5 and by 5, there remayned none. The question is to knowe howe manye egges the mayde had in all? *Answere:* For to do this, and all such like questions, you muste multiplye 2, 3, & 4, togither, saying, 2 thimes 3 make 6, and 6 times 4 make 24, vnto this number you must adde 1, and they make 25. And so many egges shee had in all. But if she had a greater number of egges that she might haue counted them till shee came to 7 and 7, after the same manner as she did, till she came to 5 and 5: you must multiply these numbers 2, 3, 4, 5, and 6, the one by the other, and thereof will come 720, vnto the whiche adde 1 and they make 721, and so many egges she should haue had, if shee had counted them by 7 and 7.

5. Agayne,

5. Agayne, if she had sayd that when she counted her egges by 2 and 2, there remayned 1, and by 3 and 3, there remayned 2, and by 4 and 4 there remained 3: and by 5 and 5: there remayned nothing, the question is to knowe howe manye egges she should haue had? Answere: you must find a number, the least that you can possible, whiche may be diuided by 2, by 3, and by 4, that is to saye, 12 is the nearelle number, diuide the same by 5, and there remayneth 2. This being done, you must fynd 2 numbers, the leaste that is possible, which may be diuided by 5, and by 2, in such sort, that the nüber whiche is diuided by 2, may exceede the other that is diuided by 5, onlye by 1: and those 2 numbers are 10, & 6, for if you diuide 6 by 2, your quotient will be 3, and 10 diuided by 5, bringeth but 2: then consider that 6 conteyneth 3 times 2. And therefore you muste multiplye 12 by 3, and they make 36, from the whiche you must subtract 1, and there will remayne 35, which is the number

that

that is required to be found.

6. And if shee had counted them after the same manner vnto 7, and that there had remayned nothing, then you knowe that 60 is the neareſt number that may be diuided by 2, 3, 4, 5, & 6, the which 60 being diuided by 7, there will remayne 4, and therefore you muſt fynde two numbers, the leaſt that may be, that can be diuyded by 4, and 7, in ſuche ſorte, that that number whiche is diuided by 4, may exceede the other number (by 1) that is diuyded by 7, the which 2 numbers are 7 and 8, for if you diuide 8 by 4, your quotient will be 2. And dividing 7 by 7, youre quotient will be 1, and therfore for becauſe that 8 contayneth 2 times 4, you muſt multiply 60 by 2, and thereof commeth 120, from the which number you ſhall ſubſtract 1, and the reſidue which are 119, is the number that is required.

7. A theefe entring into a Garden, did ſteale from thence a certayne num-

ber

ber of Apples: And at his comming forth, he did meete with 3 men, one after another, who threatned to accuse him: and for to appease them, hee gaue vnto the first, the ½ of all his Apples, who receaued the same with thankes, but he returned him 12 of them backe agayne. Then he gaue vnto the second the ½ of them that hee had remayning who receaued the same, but he gaue him backe agayne 7 Apples, and so he gaue vnto the third man the ½ of the residue who returned him foure. And in the ende he had still remayning 20 apples The question is to knowe howe many apples hee gathered in the sayde Garden? Answere, for to do this you shall subtracte 4 from 20, and there will remayne 16, the same you shall double, & they make 32: frō the which you must abate 7, and there will remayne 25, the same you shall double, and they make 50: from the which you shall subtracte 12, and there will remayne 38: where of the double whiche is 76 doeth shewe the number of apples that hee gathered,

red. This and suche like questions are eaſy to bee done in going backewardes from the ende of the question, vntill you come to the beginning thereof. But if he had giuen the ½ vnto one of them, the ⅓ vnto another, and ¼ vnto the laſt, or any other, all the ſame maye be done by the conuerſe rule, that is to ſaye, beginning at the end of the queſtion till you come to the beginning, as before is ſayd.

A Marchant did ride vnto three ſeuerall Foyres: at the firſt he doubled his money, and ſpent 10 crownes, at the ſeconde foyre he did alſo double his money, and ſpente 10 crownes: and likewiſe at ỳ third foyre he did double his money, and ſpent 10 crownes, and in the ende, he founde that he had remayning but 2 crownes. The queſtion is to knowe howe many crownes hee had at the firſt *Anſ.* for to doe this you muſte adde vnto 10 crownes, the 2 crownes whiche hee has remayninge, and they make 12, whereof you ſhall

take the $\frac{1}{2}$ which is 6: agayne adde 6 vnto 10, and they make 16, wherof you shall take the $\frac{1}{2}$ whiche is 8: finally you shall adde 8 vnto 10, and they make 18, whereof you muste take the $\frac{1}{2}$ which is 9: and so he had 9 crowns at the first.

9. A Burgeois would distribute a certayne summe of pence vnto dyuers poore men equally, but after that hee had counted howe manye they were in number, he perceiued that if he should geue vnto euery man 6 d, hee shoulde want 14 pence, But if he should geue euery man 5 pence the peece, he should haue 9 pence remayning, the question is to knowe the number of the poore men, Aunswere: for to do this, and such like questions, you muste haue in remembraunce this principle, more from more, or lesse from lesse. &c. Which is sette forth in 2 verses in the rule of false positions, that is to saye you must adde the lesse with the more. Namelye 14 with 9, and they make 23: and dy-

uide the same sume by the difference which is of 5 from 6, that is 1. And therfore you must diuide 23 by 1, but 1 doth neyther multiplye nor diuide, therefore you may conclude and saye, that there were 23 poore men.

19. And if he should geue to euery man 5 pence, he should haue 19 pence remaining, and giuing euerye man 7 pence, he should haue 3 pence ouer: In this case you must abate more from more, that is to saye 3 from 19, and the rest which is 16 you must diuide by 2, which is the difference of 5 frō 7: and the quotient which is 8, doth shewe you the number of the poore men, and likewise that if he had had both wants, that is if both the numbers had bene too little, you muste haue done wyth them as you did with the others that were both more.

A man hath geuen vnto 20 poore folke 20 s. that is to say, vnto men, women, and boyes: vnto men

he gaue 20 pence a peece, vnto women 15 pence, and vnto boyes he gaue 8 pence. The question is to knowe how many men, how many women; & how many boyes there were in all; Answere: First you must take the diserence of 8 from 15, and also 20: and you shall haue 7 for the differente of the women: & 12 for that of the men: this done, you may suppose that there were 20 boyes, the whiche at 8 pence the peece maketh 160: the which you must abate from 20 s. beeing reduced into pence, that is, from 240 pence: & there will remayn 80 pence, the which 80 you shall diuide into 2 suche partes that the one may be diuided by 7, & the other by 12. and that nothing maye remayne after the diuisions are made. The which 2 numbers are 56, and 24 For 56 being diuided by 7, bringeth into the quotient 8, and 24 beeing diuided by 12, will bring in the quotient 2: which sheweth that there was 8 women, 2 men. And the rest of the 20, which are 10, were boyes, so there

were

were 8 women, 2 men 10 boyes? Some men doo call this rule, the virgins Rule.

The 16 chapter treateth of sports and pastime, done by number.

IF you woulde knowe the number that anye man dothe thinke or imagine in his minde, as though you could diuine.

Bidde him triple the same number, then of the product let him take the ½ if the number be euen, or els the greater halfe, if the same be odde, then bidd him triple agayne the laide ½: after say to him that he shall put away if he can 36, 27, or 9, from the last number beeing tripled: that is to say, cause him subtilly to put away 9 as many times as is possible. and kepe the number secretly: and when he can no more take away 9: then to know if that yet there remayne any number, bidd him abate 3,

2, or 1, if he cā this done, see how many times 9 you haue caused him to abate, for the which keepe you in minde so many tims 2, & if that you know that he had any thing remaning besides the nines, the same shall also note vnto you 1.

Example.

Suppose that he thought 6, whiche being tripled is 18, whereof the $\frac{1}{2}$ is 9 the triple of that is 27: now cause him to abate 18 or 9, or 27: and agane 9, but then he will say vnto you that he can not, bid him then abate 3, or 2, or 1, he wil say also that he cā not: wherfore considering that you haue made him to abate three times 9 iustly, you shall tell him that he thaught 6, for 3 times 2 maketh 6. If he had thught 5, the triple thereof is 15 whereof the greater $\frac{1}{2}$ is 8, the triple of that maketh 24, which conteineth two times 9, they are worth 4, and the remayne signifieth 1, the which added together make 5, which is the nūber that he thought

2. If in any company, one of them hath a ring vpon his finger, and you would know by manner of deuining, who hath the same, & vpon what finger and what ioynte cause the persons to set down in order, & keepe likewise an order of there fingers, then seperate your selfe from them in some certaine place, and say vnto on of the lookers on, that he double the number (marking well in your minde the order) of him that hath the ring: and vnto the double bidde him adde 5, and then cause him to multiplye this addition by 5, and vnto the product bidde him adde the number of the finger of the person which hath the ring: Suppose that the same last summe did amount to 89, then afterwarde say to him that he put after the same last number towarde his right hande a figure signifying vpon which of the ioyntes he hath the ring, as if it be vppon the third ioynt, let him put 3 after 89, and it will be 893, this done, you shal aske

him

him what number he keepeth from the which you shall abate 250, & you shall haue three fygures remayning at the least. The first toward your left hande shall signifie the number of the person which hath the ring. The seconde or middle figure shall represent the number of the finger. And the last figure towards youre righte hande shall betoken the number of the ioynt, as if the number which he did keepe, were 883 from that you shall abate 250, & there will remayne 633 which do more vnto you that the sixte person hath the ring vpon the fourth fynger, and vppon his thirde ioynt.

But note that when you haue made your subtraccio, if there do remayne a cipher in the place of tennes, that is to say in the second place, you must then abate 1 from that figure whiche is in ꝑ place of hundreds, that is to say from the fygure which is nerre your lefte hand, and ꝑ shall bee worth 10 tenthes signifying the tenth finger: as if there should remayne 703, you muste saye that

that the first person (vppon his temthe finger, and vppon his thyrde ioynt) hath the ring.

3. And after the same maner if a man doe cast three dice, you may knowe the poyntes of euerye one of them, for if you doe cause him to double the poynts of one die, and vnto the double doe adde 5, and the same summe doe multiply by 5, & vnto the product adde the poyntes of one of the other dyce, and behinde the number toward the right hande, to put the fygure whiche signifyeth the poyntes of the last dye, and then shall you aske him what nũber hee keepeth, from the whiche abate 250, and there will remayne 3 fygures, which do note vnto you the poyntes of euery dye.

4. Likewise if 3 of youre companyons, to say, Peter, James, and John, would (in youre absence) gyue themselues euery one a contrarye name: as for example: Peter would bee called a King, James a Duke, and John a Countie: and you would diuyne which of them is called a King, whiche the

Duke,

Duke, and which the countie. Take 24 stones, or other peeces whatsoeuer and giue vnto Peter 1, vnto James 2, and vnto John 3, or otherwise. But marke well vnto whiche of them you haue giuen 1, vnto which 2, and vnto whome 3. Then leauing eighteene stones (before them) that are remayning, you shall absent your selfe from their sight, or else turne your face from them, saying thus vnto them, whosoeuer nameth himselfe a king, for euery stone that I gaue him, let him take 1 of the residue, and hee that nameth himselfe a Duke, for euery stone that I gaue him, let him take 2 of them that remayne, and he that calleth himselfe a countie, for euerye stone that I gaue him, let him take 4: this being donne approche neare them, and marke how many stones are remayning, and know this, that there cannot remayne anye other number but one of these fiue, 1, 2, 3, 5, 6, 7, for the which fiue numbers we haue chosen to euery one of them a seuerall name, which are these: *Angeli*

Beati,

Beati, *Taliter*, *Messias*, *Israell*, *Pietas*, each of them conteyning thyee vowels *a*,*e*,*i*, whiche doe shewe the names by order, that is to saye, the vowell a, sheweth whiche is the King, the vowell e, telleth whiche is the Duke, and the vowell i, sheweth whiche is the Countie in following the order how and to whome you haue giuen one stone, to whome 2, & to which 3, then if there do remayne but one stone, the fyrste name *Angeli*, (by these thyee vowels a,e,i) sheweth that Peter is the king, James the Duke, and John the Countie. And if there doe remayne 2 stones ỳ seconde name *Beati*, shall shewe you by these 3 vowels eal. that Peeter is the duke, James the king, and John the Countie. And so of the other, as ỳ this table doth playnely appeare.

1	2	1	2	3	3
2	1	3	3	1	2
3	3	2	1	2	1
a	e	a	e	i	i
e	a	i	i	a	e
i	i	e	a	e	a
1	2	3	5	6	7
A	*B*	*I*	*M*	*O*	*P*

The agreement of the measures, and weights of diuers Countreyes, the one with the other, being reduced to an equallitie, and drawn into Tables as followeth.

London.

100 elles at Londō do make at

Andwerpe	166 ½.
Nuremberge	174 ½.
Franct. Liebzig, & Preslaw,	208 ½.
Dantzick	138 ½.
Uienne in Austri.	145.
Lions in Fraunce.	101 ½ alnes.
Paris in Fraunce.	095.
Rouan in Norm.	086 ½.
Lithburne	100 bares.
Siuill & other places in Spay.	135.
The Isles of Nauere,	103. ½.
Uenice	180 braces.
Lucques	200 braces.
Florence	204 ½ braces.
Millan	230.
Geanes	480 ½. paulmes.

The like agreement hath 125 yards, vnto the measures aforesayde.

The agreemente of the measure at *Andwerp with the measures at other places.*

Andwerpe.

100 elles at Andwarpe do make at	London.	yardes 75, & 60 elles.
	Nuremberge,	104 ½.
	Franckford &c.	125.
	Dantzig	83.
	Vienne &c.	87.
	Lions	60 aulnes.
	Parris	57.
	Rouan	52.
	Lishburne	60 yares.
	Siuill. &c.	81.
	The Zilles. &c.	62.
	Venice	108 braces.
	Lucques.	120.
	Florence	122 ½.
	Millan	138.
	Geanes.	288 ½ paulmes.

The agreemente of the measure at *Nuremberge with the measures at other places.*

Nuremberge

100 elles at Nurẽberge doe make at	London	57 $\frac{1}{2}$ elles.
	Andwerpe	95 $\frac{1}{4}$
	Franckford &c.	119 $\frac{1}{2}$
	Dantzig	138 $\frac{1}{2}$
	Vienne &c.	83 $\frac{1}{2}$
	Lions	58 $\frac{1}{2}$ aulnes.
	Parris	54 $\frac{1}{2}$
	Rouan	49 $\frac{1}{2}$
	Lisbourne	57 vares.
	Sivill. &c.	77 $\frac{1}{2}$
	The Filles &c.	58 $\frac{1}{2}$
	Venice	103 $\frac{1}{2}$ braces.
	Lucques.	[illegible]
	Florence	[illegible]
	Millan	[illegible]
	Geanes.	276 paulmes.

The agreement of the measure at *Frankeford, with the measures at other places.*

Frankeford

	London	48 elles
	Antwerpe	80
	Nuremberge	82 ½
	Dantzig	66 ½
	Vienne, &c.	69 ½
	Lions	58 ¾ aulnes.
100 elles at Frankforde doe make at	Paris	45 ½
	Rouan	41 ½
	Lisbborne	48 vares.
	Siuill &c.	64 ¾
	The Isles &c.	80 ½
	Venice	86 ½ braces.
	Lucques	96
	Florence	98
	Millan	110 ¾
	Geanes	230 ¾ paulmes.

The agreement of the measure at *Dantzicke, with the measures at other places.*

Dantzicke.

100 elles at dãtzig doe make at

London	72 ½	Elles
Anwerpe	120 ½	
Nuremberge	125 ½	
Frankfort	150 ½	
Vienne. &c.	107 ½	
Lions	73 ½	Aulnes.
Paris	68 ½	
Rouan	62 ½	
Lisbayne	72 ½	Vares.
Seuille &c.	97 ½	
The Iles &c.	74 ½	
Venice	150	Brasses.
Lucques	144 ½	
Florence	147 ½	
Millan	166 ½	
Geanes.	337 ½	Paulmes

The agreement of the measure at Vienne, with the measures at other places.

Vienne in Austrice.

100 elles at vienne do make at

London	68 9/10	elles.
Andwerpe	114 7/10	
Nurrenberge	120.	
Franckford. &c.	143 5/7	
Dantzicke	95 3/7	
Lions	70 1/10	aulnes
Parris.	65 1/2	
Rouan	59 1/4	
Lisbonne	68 7/10	bares.
Stuell. &c.	93 1/10	
The Isles. &c.	71 1/4	
Uenice	124 1/7	braces.
Lucques,	137 9/10	
Florence,	140 4/7	
Millan	158 4/7	
Geanes	331 1/3	paulmes,

The agreement of the measures at *Leons*, with the measures at other places.

Lions.

100 aulnes at Lions doe make at

London	98 1/3 elles.
Andwarpe	163 2/3.
Nuremberge	171 1/4.
Franckford, &c.	204 1/2.
Dantzike	136.
Vienne, &c.	142 1/2.
Parris	93 2/3. aulnes.
Rouan	85 1/4.
Lishburne	98 1/3 vares.
Siuell	132 1/4
The Isles, &c.	101 1/2.
Venice	177 braces.
Lucques	199 2/3.
Florence	200 1/4.
Millan	126 1/2.
Geanes	472 2/3 paulmes.

The agreement of the measure at *Parris*, with the measure at other places.

Parris.

100 elles at Parris do make at

London	105 ¼. elles.
Andwerpe	175 ⅔.
Nuremberge	183 ½.
Franckford. &c.	219 ½.
Dantzicke	145 ⅓.
Vienne	152 ½.
Lions	107 aulnes
Rouan	91 ⅓.
Lisbborne	105 ¼. vares.
Siuell. &c.	142.
The Isles. &c.	108 ¼.
Venice	189 ⅓ braces.
Lusques,	210 ½.
Florence,	247 ⅔.
Millan	242.
Geanes	506 ½. paulmes.

The agreement of the measure at *Rouan*, with the measures at other places.

Rouan.

100 aulnes at Rouã doe make at

London.	115 $\frac{1}{8}$	elles
Andwarpe.	192 $\frac{1}{4}$.	
Nuremberge.	200 $\frac{7}{8}$	
Franckford. &c.	240 $\frac{1}{8}$.	
Dantzicke.	159 $\frac{3}{5}$.	
Uienne. &c.	167 $\frac{1}{4}$.	
Lyons.	117 $\frac{1}{4}$	aulnes.
Parris	109 $\frac{1}{7}$	
Lisbburne	115 $\frac{1}{8}$	vares.
Siuell.	155 $\frac{1}{4}$	
The Isles. &c.	119 $\frac{1}{7}$	
Uenice.	207 $\frac{2}{5}$	braces.
Lucques.	230 $\frac{1}{4}$	
Florence.	235 $\frac{1}{2}$	
Millan.	365 $\frac{1}{8}$	
Geanes.	554 $\frac{4}{5}$	paulmes

The agreement of the measures at *Lisshburne*, with the measures at other places.

Lisshburne.

100 bares at Lisheburne doe make at

London	100 elles.
Anwarpe	166 2/3
Nuremberge	174 1/2
Frankfoyd &c.	208 1/3
Dantzike	138 1/3.
Vienne	145.
Lions	101 1/4 aulnes.
Parris	095.
Rouan	086 2/3
Siuell &c.	135 bares.
The Isles, &c.	103 1/3.
Venice	180 braces.
Lucques	200.
Florence	204 1/2.
Millan	230.
Geanes	480 1/2 paulmes

The agreement of the measures at *Ciuill. &c. with the measures at other places.*

ciuill. &c.

100 vares at Siuill doe make at	London	74 elles.
	Andwarpe	123 $\frac{7}{16}$
	Nuremberge	129
	Frankford &c.	154 $\frac{1}{2}$.
	Dantzike	102 $\frac{7}{16}$.
	Vienne	107 $\frac{1}{2}$.
	Lions	75 $\frac{1}{4}$ aulnes.
	Parris	70 $\frac{1}{2}$.
	Rouan	64 $\frac{1}{2}$.
	Lisbburne	74 vares.
	The Isles, &c.	76 $\frac{1}{2}$.
	Venice	133 $\frac{1}{3}$ braces.
	Lucques	148 $\frac{1}{2}$.
	Florence	151 $\frac{1}{16}$.
	Millan	170 $\frac{1}{2}$.
	Geanes	356 $\frac{1}{4}$ paulmes.

The agreement of the measure at the Isles of Madere with the measures at other places.

The Isles of Madere.

100 vares at ỳ Isles of madere domake at	London.	96 1/4 elles
	Andwarpe.	161 1/4.
	Nuremberge.	168 1/4
	Franckford. &c.	201 1/2.
	Dantzicke.	133 1/2.
	Uienne. &c.	140 1/2.
	Lyons.	98 1/2 aulnes.
	Parris	91 1/2
	Rouan	83 1/2
	Lisbburne	96 1/4 vares.
	Siuell.	130 1/2
	Uenice.	174 1/2 yaces.
	Lucques.	193 1/2
	Florence.	197 1/2
	Millan.	222 1/2
	Geanes.	465 1/4 paulmes

The agreement of the measures at *Venice*, with the measures at other places.

Venice.

100 braces at Venice doe make at

London	55 ½ elles.
Andwarpe	92 ½.
Nuremberge	96 ¼.
Franckford. &c.	115 ¼.
Dantzike	76 ⅘.
Uienne, &c.	80 ½.
Lions	56 ½ aulnes.
Parris	52 ¾.
Rouan	48 ½.
Lishburne	55 ½ vares.
Siuell	75.
The Illes. &c.	57 ⅔.
Lucques	111 braces.
Florence	113 ⅔.
Millan	127 ¼.
Geanes	267 ½ paulmes.

The agreemente of the measures at *Lucques, with the measures at other places.*

Lucques.

100 braces at Lucques doe make at

London	50 elles.
Andwarpe	83 1/3.
Nuremberge	76.
Franckford, &c.	104 1/2.
Dantzike	60 1/2.
Uienne.	72 1/2.
Lions	50 1/2 aulnes.
Parris	47 1/2.
Rouan,	43 1/3.
Lisbburne	50 vares.
Siuell, &c.	67 1/2
The Illes, &c.	51 1/2.
Uenice,	90 braces.
Florence	102.
Millan	115.
Geanes,	240 1/3 paulmes.

The agreemente of the measures at *Florence, with the measures at other places.*

Florence.

100 brasces at Florence, doe make at.

Lonvon,	49 elles,
Andwarpe	81 1/3.
Nuremberge	85 1/4.
Frankefoyde &c.	102.
Dantzike	67 1/4.
Uienne	71.
Lions	49 1/2 aulnes.
Parris.	46 1/2.
Rouan	42 2/5.
Lishburne	49 vares.
Siuell &c.	42 2/7.
The Illes &c.	50 1/5.
Uenice	88 1/7
Lucques.	97 7/8.
Millan	112 1/3.
Geanes	235 2/7. paulmes.

The agreemente of the measures at *Millan, with the measures at other places.*

Millan.

100 braces at Millan doe make at

London	43 $\frac{2}{5}$ elles.
Andwarpe	72 $\frac{2}{3}$.
Nuremberge	75 $\frac{5}{8}$.
Franckford. &c.	90 $\frac{1}{2}$.
Dantzike	60 $\frac{1}{8}$.
Uienne.	93.
Lions	44 $\frac{1}{3}$ aulnes.
Parris	41 $\frac{1}{4}$.
Rouan,	37 $\frac{2}{3}$.
Lisbburne	43 $\frac{2}{3}$ vares.
Stuell. &c.	58 $\frac{2}{3}$
The Isles. &c.	44 $\frac{7}{8}$.
Uenice,	78 $\frac{1}{4}$ braces.
Lucques	86 $\frac{7}{8}$.
Florence	88 $\frac{1}{4}$.
Geanes,	209 paulmes.

The agreemente of the measures at *Geanes, with the measures at other places.*

Geanes.

100 paulmes at Geanes doe make at.

London,	20 ¼ elles,
Andwarpe	34 ⅓.
Nuremberge	36 ⅓.
Frankefoyde &c.	43 ⅙.
Dantzike	28 ¼.
Uienne	30 ⅓.
Lions	21 ⅓ aulnes.
Parris.	19 ¼.
Rouan	18.
Lisbburne	20 ¼ vares.
Siuell &c.	28.
The Illes &c.	21 ⅔.
Uenice	37 ⅓ braces.
Lucques.	41 ⅓.
Florence	42 ⅓.
Millan	47 ¼.

The agreement of the waights of diuers countries, the one with the other, being reduced to an equalitie, and drawn into Tables as followeth.

London.

112 li. waight at Lond̄ do make at	Andwerpe.	107 1/8.
	Franckforde.	99.
	Collen and Aulberge.	102 1/4.
	Nuremberge.	100 1/8.
	Rouan.	098.
	Lions.	118 1/8.
	Parris.	102 1/4.
	Diepe.	100 1/4.
	Geneue.	90 1/8.
	Toulouse.	122 1/4.
	Rochell.	124 7/8.
	Marceillis.	124 1/4.
	Siuill. &c.	109 1/2.
	Uenice Suttell waight.	166 7/8.
	Uenice grosse waight.	105 3/8.
	Aquilla.	157 1/4.
	Uienne.	89 1/8.
	Pzellawe.	134 1/8.
	Leibzig.	101 1/4.
	Dantzig.	129 1/4.
	Lubeck.	97 1/8.
	Barcellone.	143 1/8.
	Lisbburne the small waight	99
	Geanes.	157 1/8.

The agreement of the waight at Andwerpe, with the waight at other places.

	Andwerpe.	
100 li. waight at Andwerp do make at	London,	104 li.
	Franckford,	91 7/10.
	Collen &c.	94 7/10.
	Nurenberge.	93.
	Rouan,	91.
	Lions.	110.
	Parris,	96 1/10.
	Diepe,	93.
	Geneue,	84.
	Toulouse,	114.
	Rochell,	116.
	Marseillis,	115 1/10.
	Siuill.	101 7/10.
	Uenice suttell. &c.	155.
	Uenice grosse, &c.	97 1/10.
	Aquila,	146.
	Uienne,	83.
	Pzeslaw,	125
	Liebzig.	094.
	Dantzige,	120.
	Lubecke	90 1/10.
	Barcellone	123 1/10.
	Lisbburne	84 1/10.
	Geanes	146.

The agreement of the waight at *Frankeforde, with the waight at other places.*

Frankford.

100 li. waight at frãckford homake at	London	113 $\frac{1}{8}$.
	Andwerpe.	108 $\frac{1}{4}$.
	Collen and Ausberge.	103 $\frac{1}{4}$.
	Nuremberge.	102 $\frac{1}{8}$.
	Rouan.	099,
	Lions.	119 $\frac{5}{8}$.
	Parris.	103 $\frac{1}{4}$.
	Diepe.	101 $\frac{1}{4}$.
	Geneue,	91 $\frac{1}{4}$.
	Toulouse.	124.
	Rochell.	126 $\frac{1}{8}$.
	Marceillis.	125 $\frac{1}{2}$,
	Siuill. &c.	110 $\frac{3}{4}$.
	Uenice Suttell waight.	168 $\frac{1}{2}$
	Uenice grosse waight.	106 $\frac{1}{8}$.
	Aquilla.	158 $\frac{3}{4}$.
	Uienne.	090 $\frac{1}{4}$.
	Preslawe.	135 $\frac{7}{8}$.
	Leibzig.	102 $\frac{1}{4}$.
	Dantzig,	130 $\frac{1}{2}$.
	Lubeck,	098 $\frac{3}{4}$.
	Barcellone;	144 $\frac{7}{8}$.
	Lishburne	100
	Geanes;	158 $\frac{3}{4}$.

The agreement of the waight at *Collen, and at Ausberge, with the waight at other places.*

At collen and ausberge.

100 li. waight at Collen & Ausberge do make at	London,	109 1/2.
	Andwarpe,	105 1/4.
	Franckford,	096 1/4.
	Nuremberge.	097 7/8.
	Rouan,	095 1/4.
	Lions.	115 7/8.
	Parris,	100.
	Diepe,	098.
	Geneue,	088 1/2.
	Toulouse,	120.
	Rochell,	122 1/2.
	Marseillis.	121 1/2.
	Siuill.	107 1/2.
	Uenice, &c.	163 1/2.
	Uenice, &c.	103
	Aquila,	153 1/4.
	Uienne,	087 1/4.
	Przellaw,	101
	Liebzig.	099.
	Dantzige,	126 1/2.
	Lubecke	095 1/4.
	Barcellone	140 1/4.
	Lishburne	096 1/4.
	Geanes	153 1/4.

The agreemente of the Waightes at Nuremberg, with the waight at other places.

	Nuremberge.
London	111 ¼.
Andwarpe	107 ½.
Franckford, &c.	98 ½.
Collen, &c.	102.
Rouan	97 ½.
Lions	118 ¼.
Parris	102.
Diepe	100 ½.
Geneue	90 ¼.
Toulouse	122 ½.
Rochell	124 ½.
Marcellis	124.
Siuill	109 ½.
Uenice, &c.	166 ½.
Uenice, &c.	105 ½.
Aquila	157.
Uienne	89 ¼.
Pzeslaw	134 ½.
Liebzig	101 ½.
Dantzicke.	129.
Lubecke	97 ¼.
Barcellone,	143 ¼.
Lisbozne	98 ½.
Geanes	157.

100 li, at Nurēberge doe make at

The agreement of the Waight at Rouan, with the Waighte at other places.

	Rouan.	
100 li waight at Rouan doe make at	London	114 1/4
	Andwarpe	109 7/8
	Frankfoyd &c.	101.
	Collen. &c.	104 1/4
	Nuremberge	102 1/8
	Lions	120 7/8
	Parris	104 1/4
	Diepe	102 1/4
	Geneue	92 1/4
	Toulouse.	125 1/4
	Rochell.	127 1/4
	Marcellis	126 3/4
	Siuell.	112
	Uenice. &c.	170 1/4
	Uenice, &c.	107 1/8
	Aquila	160 1/4
	Uienne	91,
	Pzeslaw	137 1/4
	Liebzig	103 1/4
	Dantzike	131 7/8
	Luberke	99 1/4
	Barcellone,	146 1/4
	Lishburne	101.
	Geanes	160 1/4

Lions, with the waight at other places.

Lions.

London	94	
Andwarpe	90	
Franckforw. &c.	83	
Collen, &c.	86	
Nuremberge	84	
Rouan	82	
Parris	86	
Diepe	84	
Geneue	76	
Toulouse	103	100 li. at Lions doe make at
Rochell	105	
Marcellis	104	
Siuill	902	
Uenice. &c.	140	
Uenice. &c.	88	
Aquila	132	
Uienne	75	
Pzeslaw	113	
Liebzig	85	
Dantzicke.	143	
Lubecke	98	
Barcellone	156	
Lisbborne		
Geanes		

The agreement of the Waight at Parris, with the Waighte at other places.

	Parris.
London	109 1/2
Andwarpe	105 1/4
Frankford &c.	96 1/4
Collen. &c.	102 1/4
Nuremberge.	97 1/8
Rouan	95 1/4
Lions	115 7/8
Diepe	98
Geneue	88 1/4
Toulouſe.	120.
Rochell.	122 3/8
Marcellis	121 1/4
Siuell.	107 1/4
Uenice. &c.	164.
Uenice, &c.	103.
Aquſla	153 1/4.
Uienne	87 1/2.
Pzeſlaw	131 1/2.
Liebzig	94 1/8
Dantzike	126 1/4.
Lubecke	95 1/4.
Barcellone.	140 1/8.
Liſhburne	96 1/4.
Geanes	153 1/4.

waight at Parris doe make at

The agreement of the waight at Diepe, with the waight at other places.

100 li. waight at Diepe, do make at	Diepe.	
	Lonvon,	111 1/2
	Andwerpe,	107 1/4
	Franckford,	98 1/4
	Collen, &c.	102
	Nuremberge,	97 7/8
	Rouan,	97 1/4
	Lions.	118 1/8
	Parris,	102
	Geneue,	90 1/8
	Toulouse,	122 1/2
	Rochell,	124 1/2
	Marseillis,	143 1/4
	Siuill.	109 1/8
	Uenice suttell, &c.	166 1/8
	Uenice grosse,	105
	Aquila,	156 1/4
	Uienne,	89 1/8
	Pzeslaw,	134 1/4
	Liebzig.	101
	Dantzige,	128 1/4
	Lubecke	97 1/2
	Barcellon,	143 1/2
	Lisbburnee	98 1/4
	Geanes	156 1/4

The agreement of the Waight at Geneue, with the Waights at other places.

	Geneue.	
	London	123 1/4
	Andwerpe	119 1/2
	Franckford.	109 1/2
	Collen. &c.	113 1/2
	Nuremberge.	110 1/4
	Rouan	108 1/2
	Lions	131 1/2
	Parris	113 1/2
	Diepe	98.
100 li. waight at geneue do make at	Toulouse	135 1/2
	Rochell	138 1/2
	Marcellis	137 1/2
	Siuill	121 1/2
	Uenice	184 1/2
	Uenice. &c.	116 1/2
	Aquila	174.
	Uienne	98 1/2
	Pzeslaw,	148 1/2
	Liebzig.	112.
	Dantzig	143
	Lubeck	107 1/2
	Barcellone	158 1/4
	Lishburne	109 1/2
	Geanes.	174.

The agreement of the waight at *Toulouse*, with the waight at other places.

Toulouse.

100 li, waight at Toulouse do make at

London,	91 1/4
Andwerpe,	87
Franckford,	80
Collen, &c.	83
Nuremberge,	81
Rouan,	79
Lions.	96
Parris,	83
Diepe	81
Geneue,	73
Rochell,	101
Marseillis,	101
Siuill.	89
Uenice suttell, &c.	135
Uenice grosse, &c.	81
Aquila,	128.
Uienne,	72
Pzellaw,	109
Liebzig.	82
Dantzige,	105
Lubecke	79
Barcellone	116
Lisbburnee	80
Geanes	126

The agreement of the Waight at *Rochell*, with the Waights at other places.

	Rochell.	
100 li. waight at Rochel do make at	London	89 1/2
	Andwerpe	86 1/2
	Franckforp.	79 1/4
	Collen. &c.	81 1/2
	Nuremberge.	80 1/2
	Rouan	78 1/4
	Lions	94 1/2
	Parris	81 1/2
	Diepe	80 1/4
	Geneue	72 1/4
	Toulouse	98 1/4
	Marcellis	99 1/2
	Siuill	87 1/2
	Uenice	933 1/2
	Uence &c.	84 1/2
	Aquila	125 1/2
	Uienne	71 1/2
	Pzeflaw,	107 1/4
	Liebzig.	81 1/4
	Dantzig	103 1/2
	Lubeck	77 1/2
	Barcellone	114 1/2
	Lisbburne	79 1/4
	Geanes.	125 1/2

The agreement of the Waights at *Marcellis*, with the Waightes at other places,

	Marcellis.	
	London	88 1/2
	Andwarpe	86 1/2
	Franckfozde	79 1/2
	Collen, &c.	82 1/4
	Nuremberge	80 1/2
	Rouan	78 7/8
	Lions	95 1/4
	Parris	82 1/4
	Diepe	80 1/8
	Geneue	72 1/2
	Toulouse.	98 1/4
100 li. waight at Marcellis doe make at	Rochell	100 1/4
	Siuill.	88 1/4
	Uenice &c.	134 1/4
	Uenice, &c.	84 1/4
	Aquila	126 1/2
	Uienne	71 1/8
	Pzeslaw	108 1/4
	Liebzig,	81 1/8
	Dantzicke,	104.
	Lubeck	78 1/8
	Barcellone	115.
	Lishburne	79 1/8
	Geanes.	126 1/8

The agreement of the Waighte at *Siuill, with the Waightes at other places.*

Siuill.		
100 li. waight at Siuill. do make at	London	102.
	Andwarpe	98 1/2.
	Franckfoyde	79 1/2.
	Collen, &c.	93 1/2.
	Nuremberge	91 1/2.
	Rouan	89 1/4.
	Lions	107 1/2.
	Parris	93 1/2.
	Diepe	91 1/4.
	Geneue	82 1/4.
	Toulouse.	111 1/4.
	Rochell	113 1/4.
	Marcellis	113 1/4.
	Uenice &c.	152.
	Uenice, &c.	96.
	Aquila	143 1/2.
	Uienne	81 1/2.
	Pzeslaw	122 1/2.
	Liebzig,	92 1/4.
	Dantzicke,	117 1/4.
	Lubeck	88 1/2
	Barellone	130 1/4.
	Lisbburne	90 1/2.
	Geanes.	143 1/2.

The agreement of the ſuttell waight at *Venice*, with the waight at other places.

100 li. ſuttell waight at Venice, doo make at	Venice ſuttell waight.	
	London	67
	Andwerpe.	64 1/2
	Franckford.	59 1/4
	Collen and Auſberge.	61 1/4
	Nurembergo.	60.
	Rouan.	58 1/8
	Lions.	71.
	Parris.	61 1/4
	Diepe.	60.
	Geneue,	64 1/2
	Toulouſe.	73 1/2
	Rochell.	74 1/2
	Marcelllis.	74 1/2
	Siuill. &c.	65 1/4
	Venice Groſſe waight.	63 1/8
	Aquilla.	94 1/2
	Uienne.	53 1/2
	Pzeſlawe.	80 1/2
	Leibzig.	60 1/8
	Dantzig.	77 1/8
	Lubeck,	58 1/4
	Barcellone,	86
	Antſhourne	59 1/4
	Geanes,	94 1/8

The agreement of the grosse waight at Venice, with the waight at other places.

Venice grosse waight.

London	196 1/4
Andwerpe.	102 1/2
Franckford.	93 1/2
Collen and Aulsberge.	97.
Nurembergе.	95.
Rouan.	93.
Lions.	112 1/2
Parris.	97.
Diepe.	95 1/2
Geneue,	85 1/2
Toulouse.	116 1/4
Rochell.	118 3/4
Marcellis.	117 3/4
Siuill. &c.	104 3/4
Venice Sutrell waight.	158 3/4
Aquilla.	149 1/2
Uienne.	84 1/4
Pzeslawe.	127 1/4
Leibzig.	96.
Dantzig,	122 1/2
Lubeck,	97 1/2
Barcellone,	136 1/2
Lishburne the small waight	92 1/2
Geanes,	149 1/2

100 li. grosse waight at Venice, do make at

The agreemente of the Waight at *Aquila, with the Waights at other places.*

Aquila.

100 li, waight at Aquilla doe make at	London,	71 1/4.
	Andwarpe	68 1/2.
	Frankeforde &c.	62 7/8.
	Collen. &c.	65.
	Nuremberge	63 1/8.
	Rouan,	62 1/4.
	Lions	75 1/4.
	Parris	65.
	Diepe	63 1/8.
	Geucue	57 1/8.
	Touloule	78.
	Rochell.	79 1/8
	Marcellis	79.
	Siuell	69 1/4.
	Uenice suttell. &c.	106.
	Uenice grosse. &c	67.
	Uienne	56 1/4
	Prellaw	85 1/4
	Liebzig	64 1/4
	Dantzike	82 1/8
	Lubecke	61 7/8
	Barcellone	91 1/4
	Lisbburne	62 7/8
	Geanes	100.

The agreement of the measures at Vienne, with the measures at other places.

100 li. waight at Vienne, doe make at.

	Vienne.
London.	125 1/4.
Andwarpe.	120 1/4.
Franckford.	110 3/4.
Collen, &c.	114 1/2.
Nurembergе.	112.
Rouan	109 1/2.
Lyons.	132 1/2.
Parris	114 1/2.
Diepe	112 1/2
Geneue	101 1/2.
Toulouse	137 1/2
Rochell	139 1/2
Marcellis	139.
Siuill	122 3/4.
Uenice suttell, &c.	186 1/2.
Uenice grosse, &c.	117 7/8
Aquila	175 7/8.
Pzellaw	150 1/2.
Liebzig	113 1/4.
Dantzike	144 1/2.
Lubecke	108 7/8.
Barcellone	160 1/2.
Lisbburne	110 1/4.
Geanes	175 7/8.

The agreemente of the Waight at *Preslaw, with the Waights at other places.*

		Preslaw.
	London,	83 1/2
	Andwarpe	79 1/2
	Frankefoorde &c.	73 1/2
	Collen. &c.	75 1/2
	Nuremberge	74 1/4
	Rouan,	72 1/4
	Lions	88.
	Parris	75 1/2
	Diepe	74 1/2
100 li,	Geneue	67 1/2
waight at	Toulouse	91 1/2
Preslawe	Rochell.	92 1/4
doe make	Marcellis	92 1/4
at	Siuell	81 1/2
	Uenice suttell. &c.	123 1/2
	Uenice grosse. &c	78 1/4
	Aquila	116 1/4
	Uienne	66 1/2
	Liebzig	75 1/2
	Dantzike	96 1/2
	Lubecke	72 1/4
	Barcellone	106 1/2
	Lishburne	73 1/2
	Geanes,	116 1/4

The agreement of the measures at *Liebsige*, *with the measures at other places.*

Liebsige.

100 li, waight at Liebsige, doe make at:

London.	110 2/3
Andwarpe.	106 1/4
Franckford.	97 1/4.
Collen. &c.	100 7/8
Nuremberge	98 7/8.
Rouan	96 1/4.
Lyons.	117.
Parris	100 7/8.
Diepe	99.
Geneue	89 1/4.
Toulouse	121 1/8
Rochell	123 1/4
Marcellis	122 1/8.
Siuill	108 1/8
Uenice suttell. &c.	164 1/4
Uenice grosse. &c.	104.
Aquila	155 1/4.
Uienne	88 1/4.
Pzellaw	732 7/8.
Dantzike	127 1/8.
Lubecke	96 1/8.
Barcellone	141 1/8.
Lishburne	97 1/4.
Geanes	155 1/4.

The agreement of the waight at Dantzicke, with the waight at other places.

		Dantzick.
100 li. waight at Dantzig, do make at	London,	86 7/8
	Andwerpe,	83 1/4
	Franckford,	76 1/2
	Collen. &c.	79
	Nuremberge.	77 1/8
	Rouan,	75 1/4
	Lions.	91 1/8
	Parris,	79
	Diepe	77 1/2
	Geneue,	69 7/8
	Toulouse	94 7/8
	Rochell,	96 1/2
	Marseillis.	96 1/8
	Siuill.	84 3/8
	Uenice surtell. &c.	129.
	Uenice grosse, &c.	81 1/2
	Aquila,	121 5/8
	Uienne,	69 1/8
	Pzeslaw,	104 1/8
	Liebzig.	78 1/4
	Lubecke	75 1/8
	Barcellone	111.
	Lisbburne	76 1/8
	Geanes &c.	121 5/8

The agreement of the waightes at *Lubecke, with the waightes at other places.*

Lubecke.

100 li, waight at lubeck do make at

London.	115
Andwarpe.	110 1/2
Franckford.	101 1/2
Collen. &c.	105
Nuremberge	102 3/4
Rouan	100 1/2
Lyons.	121 1/2
Parris	105.
Diepe	102 1/2
Geneue	92 1/4
Toulouse	126.
Rochell	139 1/4
Marcellis	127 1/2
Stuill	114 1/2
Uenice suttell. &c.	171 1/4
Uenice grosse. &c.	108 1/2
Aquila	161 1/2
Uienne,	91 1/4
Pzellaw	138 1/4
Liebzig	103 1/2
Dantzike	132 1/2
Barcellone	147 1/4
Lishburne	101 1/2
Gennes	161 1/2

The agreemente of the Waightes at *Barcellone, with the Waight at other places.*

Barcellone.

100 li, at Barcellone doe make at	London	78.
	Andwarpe	75.
	Franckford. &c.	68 5/8
	Collen, &c.	71 1/2
	Nuremberge	69 3/4
	Rouan	68 1/4
	Lions	82 1/2.
	Parris	71 1/4
	Diepe	69 3/4.
	Geneue	62 7/8
	Toulouse	85 1/2
	Rochell	87
	Marcellis	86 1/2
	Siuill	76 3/8
	Uenice. &c.	116 1/4
	Uenice. &c.	173 1/8.
	Aquila	109 1/2.
	Uienne	62 7/8.
	Preslaw	93 3/4.
	Liebzig	70 1/2.
	Dantzicke.	90.
	Lubecke	67 5/4.
	Lishborne	68 5/8
	Geancs	109 1/2.

Ee. ii.

The agreement of the Waight *at Lishburn with the Waight at other places.*

Lishburne

100 li waight at Lishburn doe make at	London	113 $\frac{1}{8}$
	Andwarpe	108 $\frac{1}{4}$
	Frankford &c.	100.
	Collen. &c.	103 $\frac{1}{4}$
	Nuremberge	102 $\frac{1}{8}$
	Rouan.	99
	Lions	119 $\frac{5}{8}$
	Parris	103 $\frac{1}{4}$
	Diepe	101 $\frac{1}{4}$
	Geneue	91 $\frac{1}{4}$
	Toulouse.	124
	Rochell.	126 $\frac{1}{8}$
	Marcellis	125 $\frac{1}{2}$
	Siuell.	110 $\frac{1}{4}$
	Uenice. &c.	168 $\frac{1}{2}$.
	Uenice, &c.	106 $\frac{1}{8}$
	Aquila	158 $\frac{3}{4}$.
	Uienne	90 $\frac{1}{4}$
	Preslaw	135 $\frac{7}{8}$
	Liebzig	102 $\frac{1}{4}$
	Dantzike	130 $\frac{1}{2}$.
	Lubecke	98 $\frac{1}{4}$.
	Barcellone.	144 $\frac{7}{8}$.
	Geanes	158 $\frac{3}{4}$.

The agreemente of the Waight at *Geanes, with the Waights at other places.*

Geanes.

100 li. waight at Geanes, doe make at	London,	71 1/4
	Andwarpe	68 1/2
	Frankefoyde &c.	62 7/8
	Collen. &c.	65
	Nuremberge	63 1/2
	Rouan,	62 1/4
	Lions	75 1/4
	Parris	65
	Diepe	63 1/2
	Geneue	57 1/2
	Toulouse	78.
	Rochell.	79 1/2
	Marcellis	79
	Sinell	69 1/4
	Venice sutell. &c.	106
	Venice grolle. &c	67
	Aquila	100.
	Vienne	56 1/4
	Pzellaw.	85 1/4
	Liebzig	64 1/4
	Dantzike	82 1/2
	Luberke	61 7/8
	Barcellone	91 1/4
	Lisbburne	62 7/8

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